PRACTICAL SURGERY ILLUSTRATED

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BY VICTOR PAUCHET

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VOLUME THREE



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GENERAL INTRODUCTION

THE reputation of Victor Pauchet as a bold and brilliant surgeon stands high in Paris

"Practical Surgery Illustrated," translated into English by Dr F R B Atkinson, cannot fail to enhance that reputation, and will enable English surgeons to study Pauchet's methods in detail with both pleasure and profit

Practical Surgery Illustrated" makes no claim to be a text book of operative surgery It claims rather to illustrate operations as practised by the author, and these claims are well substantiated. The illustrations are drawn from life, the text explains them The author presents his methods in a series of living pictures in a manner which should appeal to the practical surgeon

English surgeons will note with interest that local, spinal, and splanchnic anæsthesia have practically supplanted general anæsthesia in Victor Pauchet's practice

C GORDON WATSON

INTRODUCTION TO VOLUME III

The volume opens with the indications for **radicotomy** (posterior root section), and the operation as performed in the lumbo-sacral region is described Pauchet favours removal of the laminæ with gouge forceps in preference to saw or chisel he turns up the spinous processes with their interspinous ligaments as a flap which he replaces after permanent resection to prevent deformity The technique is quite clear from the illustrations alone

The **operative treatment of fractures** is *dealt with by* Docteur Dujarier He advocates operation for practically all fractures of the long bones with displacement including the clavicle. Steel bands, such as Professor Patti uses, plates and screws are advocated Technical details are omitted The illustrations depict plating of the shaft of the humerus and encircling the oblique fracture of the tibia with steel bands

Cancer of the Tongue —Pauchet lays stress on the four rules laid down by Sébileau which are in effect that—

' Leukoplakia on an indurated base is surgically cancer A patch of smooth leukoplakia which becomes warty is histologically cancer Improvement from antisyphilitic treatment is a dangerous illusion. Every lesion of the tongue not proved to be innocent should be treated as malignant '

Pauchet anticipates good results from radium treatment in the future but for the present gives preference to surgical treatment Surgery in advanced cases is opposed and removal of the glands is advocated in all cases which are operable The submaxillary route is favoured when the posterior half of the tongue is involved, and the jaw is split when the floor of the mouth is involved.

The external carotid is tied as a routine when glands are excised, presumably on one side only

Surgeons will note with interest that **regional anæsthesia** is employed in all cases.

Goitre —The chapter on **goitre** will *attract attention. The* author holds views with regard to the pathology and operative treatment which are in some respects unorthodox. Pauchet has

performed 300 operations on the thyroid with only one death, and he states that Léon Bérard (of Lyon) has operated on a thousand goitres without a death These are figures which must excite the admiration, if not envy, of English surgeons.

The chapter on **Gastric and Duodenal Ulcer** opens with a useful table indicating the various operative measures employed.

Pauchet advocates the short loop posterior gastro-jejunostomy for duodenal ulcer, with the addition of a few sutures to bury the ulcer when possible, as the routine procedure for the general surgeon who has not gained special experience in gastric surgery

He is opposed to the exclusion of the pylorus by pre-pyloric division, and considers that the method favours jejunal ulcer and increases the operative mortality Further, he holds that pyloric occlusion is sufficiently secured by invagination of the duodenal ulcer

On the other hand, he favours partial gastrectomy when there is marked hyperacidity, and states that the mortality is lower than for pyloric division with gastro-enterostomy

For experienced surgeons he advocates excision of the involved area of the duodenum with the pylorus (duodenectomy) with closure of the ends and gastro-jejunostomy, and when duodenal and gastric ulcers coexist he recommends removal of a portion of the stomach with the duodenum and pylorus (gastrectomy) In cases associated with hæmorrhage the duodenal ulcer is cauterised, and the margins sutured and invaginated.

Pauchet does not hesitate to remove the gall bladder at the same time when gall-stones are associated with duodenal ulcer

For **gastric ulcer** he is a strong advocate of partial gastrectomy with direct anastomosis (Péans operation) and states that he secures better results than he did formerly with Billroth s or Polya's operation, especially as regards regurgitant vomiting He does not favour cauterisation of the ulcer (Balfour s operation) except in acute cases which threaten perforation or bleed

Pauchet s technique in gastric surgery is fully illustrated and explains itself

Pauchet's gastric écraseur requires special mention.

Tumours of the Large Intestine—Pauchet is a keen supporter of Lane's views on the production of cancer

He holds that feeble individuals suffering from atonic colon stasis are predisposed to cancer of the breast, etc, to the exclusion of intestinal cancer, whereas the stronger type who suffer from kinks and adhesions are prone to develop intestinal cancer

Stress is laid on diarrhœa as a symptom of carcinoma of the proximal colon and constipation of the distal Early exploratory operation is urged in doubtful cases, due importance is given to the value of positive radioscopy, and due caution as to the uncertain value of negative evidence.

Stress is laid on the technical details which are essential to success in colon anastomosis, and preference is given to end to-end suture

The following methods are advocated

(1) Cæcostomy under local anæsthesia in cases of acute obstruction. (2) In subacute cases without distension a two-stage method with temporary colostomy is advocated for left sided or transverse growths (*vide* Figs 180 and 181) and primary resection with ileo-colostomy for right-sided growths carried out in one or two stages according to the fitness of the patient.

Temporary cæcostomy followed by resection later is advised for sigmoid growths unless there is a long loop

In the absence of obstruction total colectomy is urged for all colon cancers, except those at the lower end of the pelvic colon which are treated by abdomino-anal excision.

The author gives his reasons for advocating total colectomy in these cases on page 171 but he states that in practice he more often *employs partial colectomy*

The chapter concludes as follows

The future results are good for there are three good cancers—those of the uterus of the labia and of the large intestine. These tumours are often cured by an operation well planned and executed "

Adenoma of the Prostate—The volume concludes with a short commentary on Freyer s operation for removal of an adenomatous prostate

Pauchet believes that the open operation as opposed to the blind method of Freyer is likely to come into greater prominence, because the operation is of special value when the prostate is small and hard, inflamed, or the seat of malignant disease, and also because hæmorrhage can be controlled more easily In these views he will meet with strong support from many of his English confrères

He believes that the operation ought to be performed in two stages in about twenty five per cent of the cases, and he favours the perineal route in the fat the cardiac, and dropsical

The technique is not described but is made clear in the illustrations.

The following points may be noted

(1) Preliminary vasectomy, (2) the use of scissors to cut a complete circle through the mucosa round the prostate before enucleation

C GORDON WATSON

January 1925

CONTENTS

PRACTICAL SURGERY ILLUSTRATED

I

INDICATIONS FOR RADICOTOMY

By J A. SICARD,
Professeur Agrégé of the Faculty of Medicine of the Necker Hospital

RADICOTOMY is only applicable to the posterior roots Every anterior radicotomy causes mutilation, for it certainly will end in paralysis of the motor areas supplied

Radicotomy is indicated—

1 In cases of obstinate algias, not alleviated by the ordinary remedies, or by operation on the peripheral nerve

2. In cases of contractures or spasms of the areas supplied

1 Anti-algesic Radicotomy

1 TRIGEMINUS —The essential facial neuralgias of the type "tic douloureux' of Trousseau, which rapidly return after local injections of alcohol, or which occur in young subjects who desire to be relieved permanently of their pain, are justifiable cases for radicotomy The sympathetic algias characterised by constant pain and a tendency to spread, and equally also the prosopalgias in those advanced in years, with failing heart and kidneys, are contra indications

The operative results are excellent. Cure is certain and permanent. Radicotomy of the fifth cranial pair is the only one in which section of the two roots, motor and sensory, is permissible, their intimate connection, moreover, preventing the surgeon from separating them. Radicotomy sensory and motor, does not cause serious disturbance of mastication, the supply from the nerve of mastication of the opposite side being always sufficient.

2 POST ZOSTERIAN ALGIAS —Persistent intense pain is an indication for operative interference. The results are favourable in only half the cases. The inflammation can affect the four centres of

the nervous system connected with the production of pain spin ganglion, posterior root, cells of the posterior horn, sympathet ganglion and sympathetic system of the intra and para medulla region. It is not actually possible to distinguish the part play by these different centres, and to prognosticate the operative resul The greater part played by the sympathetic and by the cells of tl cornua explains the surgical failure.

3 TABETIC ALGIAS (LIMBS AND STOMACH) —Fixity of the pa in a localised area (foot, for example) is an indication, and, abo all, the frightfully painful paroxysms with closely approximati exacerbations, creating a veritable topalgic state

The results are favourable, also, in only half the cases, the cu of the pain is dependent as in zona, on the part played by the lesic of the respective painful accessible centres.

4 *POST TRAUMATIC CAUSALGIA.*—*Alcoholisation should alwa* be tried first If it fail, if there be exacerbations, or if interventic on the peripheral nerves have given no results, division of tl posterior roots is indicated Cure is, then, the rule

5 ALGIAS OF CANCER.—Radicotomy is indicated when a localise unilateral growth is accompanied by intolerable pains, resistant t morphia, and on condition that all the posterior roots innervatin the area affected by the neoplasm can be divided

2 Antispasmodic Radicotomy

The posterior roots transmit to the medullary centres all externa impressions. Thus, a kind of permanent excitation is kept up a the level of the medullary motor centres, which excitation is dis tributed by means of the anterior roots to the muscles—muscula tonus

When hypertonus with permanent contracture automati spasms, clonus, etc , are produced, division of the posterior root modifies the tonus and substitutes hypotonia for hypertonia Little's disease, contractures of the terminal parts, and certai paralyses are wonderfully improved by posterior radicotomy, o condition that the choice of the roots to be divided has been carefull considered, and their position well mapped out.

In these different affections of the nervous system the surgica result cannot be perfect, it is necessary to take account of the previou condition of the pyramidal motor system, and above all, of th paresis so often associated with spasm or contracture.

Operative Remarks (with Dr Robineau) —The neurologist having determined the numerical order and the number of the roots to be divided, the operator must remember the differences between the position of the vertebra and the medullary roots, which vary according to the levels

In the *cervico-brachial level* the posterior roots, horizontal up to the third, descending obliquely from the fourth to the eighth, are triangular, prominent and easy to mark out individually Above the fifth cervical it is difficult to separate the ascending root of the spinal nerve supplying the trapezius and sterno-mastoid, the emergence of which is just in front of the posterior roots. It is also necessary to take into account the inhibition of the motor cells of the phrenic at the moment of division of the corresponding posterior roots

In the *thoracic region* the roots, descending obliquely come off from the spinal cord above the trunks of conjugation through which they must pass the difference in the level amounts on the average to two vertebræ, a little less above, more below

Division of any one of the first nine posterior dorsal roots nearly always produces sudden cessation of the pulse and of the respiration, from three to fifteen seconds, which then becomes perfectly normal, the inhibition is more marked at the moment of section of the first root than after that of the succeeding roots.

In the *lumbar region* the roots are grouped round and below the medullary cone, continued by the filum terminale, constituting the cauda equina (L 3, L 4 L 5, S 1 S 2, S 3, S 4, S 5) The cone corresponds to the body of the second lumbar or its superior part, sometimes to the lower border of the first The roots float intermingled in the cerebro-spinal fluid, and their numbers cannot be counted, their size is very small and at first sight after resection it is surprising how small is the size of the bundle formed by the collection of the posterior roots and of the two or three lumbars. It is very difficult to know exactly the number of roots divided it is better to cut too many than too few It is preferable to resect, to prevent all chance of future regeneration.

One or two fine vessels are seen among the roots, and can sometimes be isolated the hæmorrhage resulting from their division cannot be stopped by a ligature it offers no inconvenience except in hiding the operative field It is, therefore, absolutely necessary to mark out and to charge a hook with all the roots, before dividing any of them.

The surgeon must be acquainted with two essential facts At the level of the cauda equina especially, the operator cannot be certain he has picked up with his blunt hook only posterior roots one or more anterior roots may have become insinuated among the mass of these posterior roots To avoid any mistake, it is sufficient to excite gently each root with a pair of fine blunt forceps, if there be no response, the root is a posterior one in the contrary case, a muscular shock is immediately produced, most marked in the peripheral area supplied by the root excited. The movements of flexion or of extension, etc , of the great toe, or of the foot can thus be provoked and distinguished

If any doubt arise as to the number of the root caught up, whether an upper or a lower lumbar, or a sacral nerve, it is only necessary to pick up the corresponding anterior root—an easy task in the neighbourhood of the cord—and to excite it. The localisation of the muscular shock on the lateral wall of the abdomen, or on the lower limb, gives the required answer The exact topography of the posterior roots is determined in this way, if need be. Posterior radicotomy is an operation giving rise to few risks, above all if it be limited to the lumbo-sacral roots It is, on the contrary, a most serious operation if bilateral section of the roots be performed at the same time. In the superior cervical region, unilateral division is serious, bilateral section is, so to speak, a sentence of death, the same applies to the lumbo-sacral region In the dorsal region, on the contrary bilateral division does not run so great a risk.

Unilateral radicotomy in the lumbo-sacral region is not followed by bladder and rectal symptoms, bilateral symmetrical section always produces retention of urine. In the adult, bilateral division of three or four roots immediately adjoining each other produces severe motor symptoms sphincter troubles and bed-sores, the result is fatal Microscopic examination shows vascular affection of the medullary parenchyma and punctate hæmorrhages.

Three cases of bilateral and symmetrical lumbo-sacral radicotomy for cancer of the true pelvis with intolerable pains and a desire to commit suicide, have been followed by total paraplegia sphincter troubles, bed sores, and death at the third week, notwithstanding that the wound healed normally In a case of spasmodic paraplegia with contractures of the lower limbs with disseminated sclerosis death followed six weeks after, with flaccid paraplegia, retention of urine and bed sores.

Posterior bilateral and symmetrical radicotomy in the cervical and lumbo-sacral regions in one stage is not therefore justifiable

On the contrary, in cases of spasmodic contractures, if absolutely necessary, bilateral radicotomy is permissible, on condition that the division is not carried out on roots immediately adjoining each other It is necessary to leave alone a certain number of intermediate roots

Unilateral radicotomy *remains the operation of choice* Carefully thought out in certain rebellious, or in certain cases of incurable contractures, it is an intervention of undoubted usefulness, curing in about 95 per cent. of cases

II

TECHNIQUE OF POSTERIOR RADICOTOMY

By M. ROBINEAU
Surgeon to the Necker Hospital

I WILL describe lumbo-sacral radicotomy

PREPARATION OF THE PATIENT —Open the bowels the day before, and shave the back and buttocks

It is absolutely necessary to mark out the first lumbar spine, and to make a radiographical examination, the spines cannot be counted when the person is asleep on his stomach, at the time of the operation. The spines are, therefore, to be counted previously with the patient sitting and leaning forwards, from below upwards, beginning at the fourth lumbar, which is easily counted, then from above downwards, commencing from the seventh cervical, frequently we are deceived as to the number, and find one vertebra too little. On the sides of the presumably first lumbar spine, the skin is marked with Indian ink or methylene blue, a metal coin as a landmark is stuck on at this level, and a radiogram taken, the patient lying on his stomach. The plate shows if the metal have been properly placed (Fig 1) or if correction be necessary

CHOICE OF THE ANÆSTHETIC —I prefer general anæsthesia with ether, spinal anæsthesia is not to be recommended, the flow of cerebro-spinal fluid abolishing the action of the anæsthetic towards the end of the operation. I do not know what would be the result of regional anæsthesia. The operation should be carried out slowly, it is not advisable to push the anæsthetic deeply a useful adjuvant consists in soaking the exposed roots with an anæsthetic solution (1 in 10), this abolishes the inhibitory reflexes.

For cervical radicotomy it is convenient to operate on the patient in the sitting position, rectal anæsthesia with ether sends him half asleep, local anæsthesia does the rest.

OPERATION —The patient lies on his stomach, a cushion raises the right shoulder to free the face, and the surgeon stands on the left side (Fig 2) He finds the landmark on the first lumbar spine, and counts two spines above (D 11 D 12), and two spines below

(L 2, L 3) This is the extent of the resection. The operation consists of two stages the first is an ordinary laminectomy, the second consists in opening the dura mater and dividing the roots.

POST-OPERATIVE PRECAUTIONS —Dorsal or ventral position, as the patient desires See that the dressing is firm Avoid burning from hot bottles on the anæsthetised limb Be on the watch for bed sores

Remarks —During the course of a radicotomy, all sudden and rough manœuvres which can injure the cord or the roots must be avoided It is necessary to see carefully what is being done, these are two conditions essential to success, *therefore, conduct the* operation carefully and slowly

Hæmostasis must be perfect all through the operation, a laminectomy properly carried out bleeds little, does not require the application of forceps, and needs only two stoppages, to tampon with gauze and to dry the wound

All bruising instruments should be avoided (hammer and chisel), gouging forceps only should be used At first it is difficult to enter the spinal canal, a little patience always succeeds When the first lamina is removed, the work becomes easy

The discharge of cerebro-spinal fluid always produces a marked depression of the pulse but up to now has not caused me any uneasiness or interrupted the operation I have never bent my patients forward, a cervical radicotomy can be performed in the sitting posture as an operation on the cerebellum The spinal con tents are never dry there is always fluid, which flows forward and backward synchronous with expiration and inspiration I have, therefore, never found it necessary to irrigate continuously the spinal canal with physiological warm water

Irritation of the posterior roots with a hook or with the scissors which divides them produces some inco-ordinated movements of the heart and a new fall of pressure with the dorsal roots there is also a temporary arrest of respiration and of the heart. This shows with what gentleness and care these roots should be touched It is therefore very useful at least as far as the cervical and dorsal roots are concerned to anæsthetise them by soaking them with a solution of novocaine or stovaine (10 per cent) But I ought to mention this is often followed by a general increased depression which is scarcely more satisfactory than the fall of arterial pressure or the disordered heart Despite this anxious side of the operation,

radicotomy does not cause immediate death, nor in the following days.

Should the spines be replaced? The question does not arise in a laminectomy for decompression After permanent resection, I have heard patients complain of an abnormal protrusion of the spines above and below the resection, and of an intermediate depression. The sole reason for replacing the spines is to prevent this deformity, it is quite slight. In all cases the spines become engrafted perfectly

The results of radicotomy are often paradoxical I do not believe the classic idea to be entirely correct, according to which the division of three consecutive posterior roots produces anæsthesia of a peripheral area, I have cut six to seven consecutive sacro-lumbar roots and have observed only slight peripheral hypo-æsthesia in other patients, a less extensive division has produced total anæsthesia of the limb My conclusion is, that the topography of the sensory roots ought to be more completely studied, the surgeon should, therefore, never predict the extent of the anæsthetic area On the other hand, I know that algias are at least alleviated and more often quite cured by radicotomy

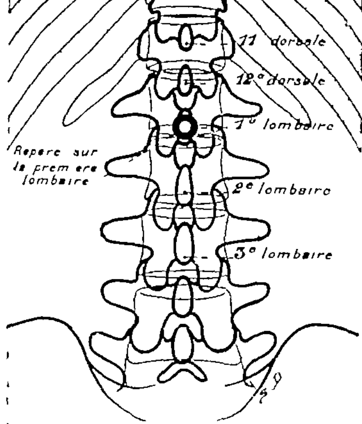


Fig 1 —Posterior Radicotomy

The radiograph shows the metallic landmark has been placed correctly on the first lumbar

Repère sur la première lombaire = Landmark on the first lumbar
11e dorsale = 11th dorsal.
12e dorsale = 12th dorsal.
1e lombaire = 1st lumbar
2e lombaire = 2nd lumbar
3e lombaire = 3rd lumbar

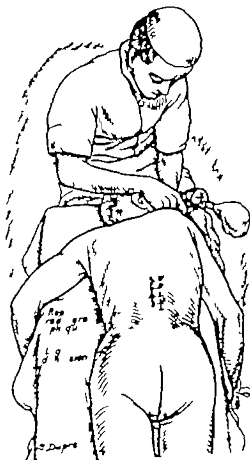


Fig 2 —Posterior Radicotomy

Position of the patient lying down on his face The median line of incision is marked on the skin on both sides of the ink marks.

Repère radiographique = Radiographic landmark.

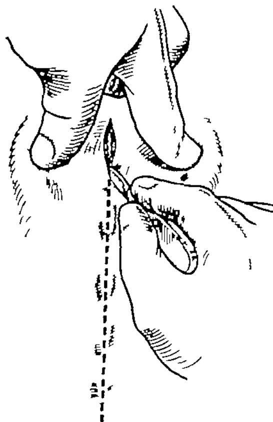


Fig 3 —Posterior Radicotomy

The median incision passing above and below the limits of the spinous processes to be resected.

Ligne d'incision = Line of incision.

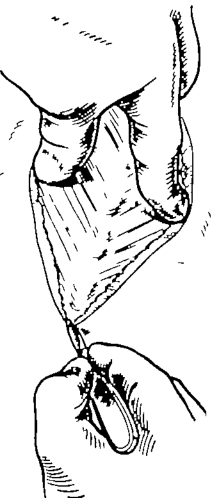


Fig 4 —Posterior Radicotomy

The cutaneous incision is finished

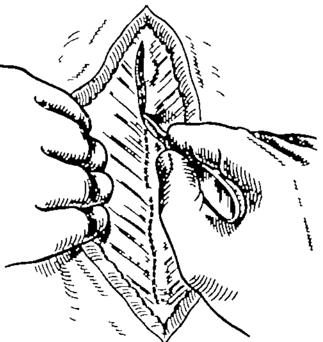


Fig 5 —Posterior Radicotomy

The bistoury begins the incision of the musculo-tendinous level on the left side, close to the spinal apophyses and the intervals between them following the dotted line

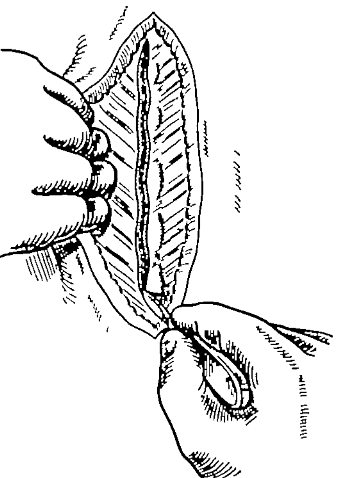


Fig 6 —Posterior Radicotomy

The bistoury completes the superficial muscular incision to the extent of the cutaneous incision; it does not lose contact with the spinous processes

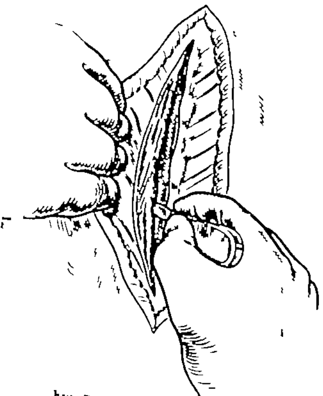


FIG 7 —POSTERIOR RADICOTOMY

The bistoury begins to separate the muscles on the left lateral surface of the spines, scraping the bone; any cut into the muscles produces hæmorrhage; if the bone be followed closely hæmorrhage is in significant.

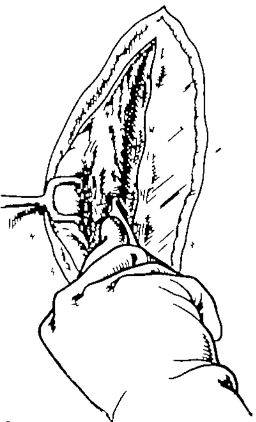


FIG 8 —POSTERIOR RADICOTOMY

A hook has slightly pulled back the muscles; the raspatory follows the place of detachment of the muscles on the side of each spinous apophysis; it must be turned from below upwards; too much attention need not be given to the interspinous spaces

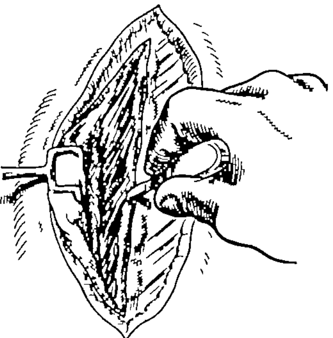


FIG 9 —POSTERIOR RADICOTOMY

The raspatory has not been able to detach all the tendinous sheaths inserted on the lower border of the spines; the bistoury divides these attachments, or what remains of them from below upwards

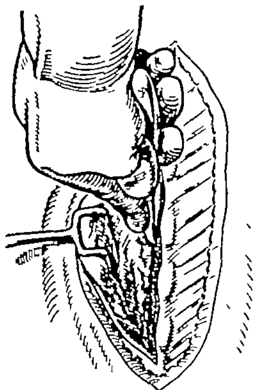


Fig 10 —Posterior Radicotomy

The raspatory turned now from within outwards begins to lay bare the posterior surface of the lamina

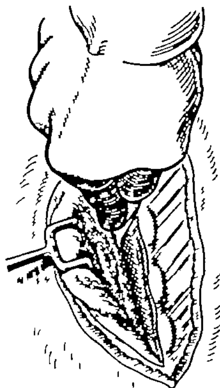


Fig 11 —Posterior Radicotomy

The hook pulls the muscles still more aside. and enables the operator completely to lay bare the laminæ in the whole extent of the incision

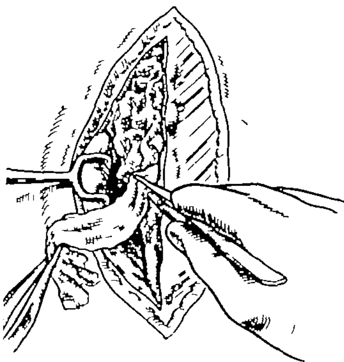


Fig 12 —Posterior Radicotomy

A gauze drain is forcibly pushed into the wound in order to dry up all hæmorrhagic discharge.

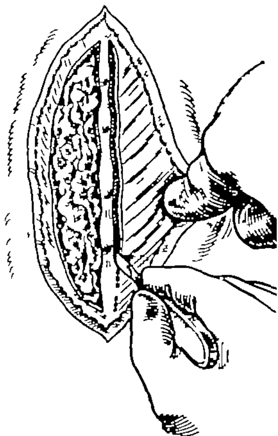


Fig 13.—Posterior Radicotomy

Incision of the musculo-tendinous level on t right side of the spines, with repetition of the stages which have been described on t left side

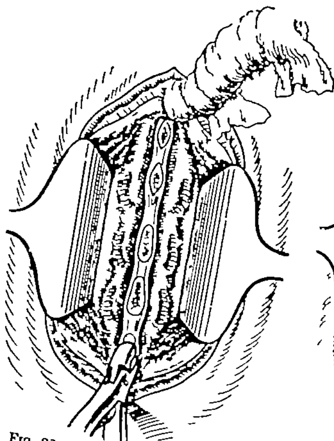


Fig 22.—Posterior Radicotomy
An ordinary pair of gouge forceps endeavouring to bite into the lower border of the lamina of the lowest vertebra.

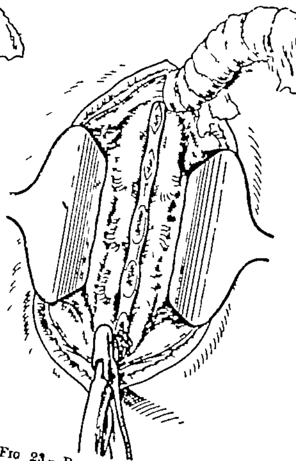


Fig 23.—Posterior Radicotomy
It removes numerous fragments and finally enters into the spinal column at the side of the spine

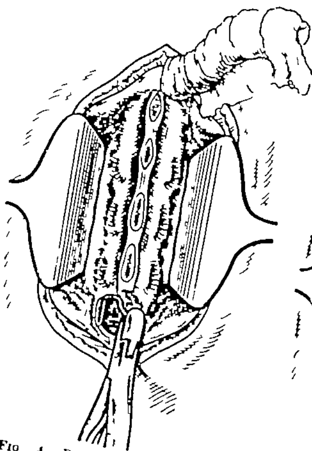


Fig 24.—Posterior Radicotomy
Cutting away little by little the gouge forceps enlarges on both sides the opening of the spinal canal.

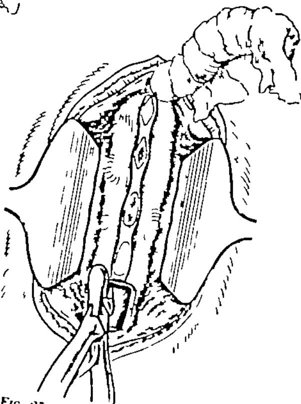


Fig 25.—Posterior Radicotomy
Chipault's gouge forceps with a flat biting surface can now be inserted from below upwards the flat surface cannot injure the dura mater; it breaks away the left lamina—

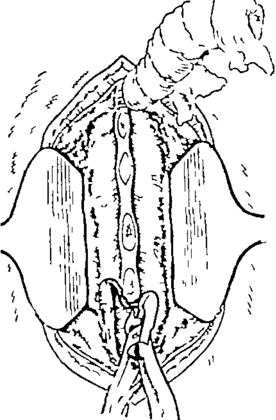


Fig 26.—Posterior Radicotomy
—then the right

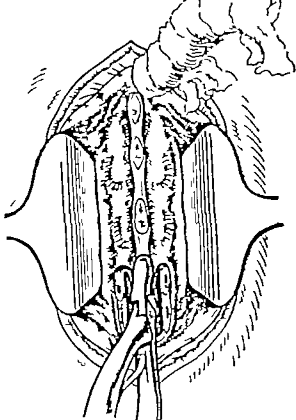


Fig 27 —Posterior Radicotomy
The gouge forceps finally breaks away the base of the spinous process, and does the same with little trouble to the adjacent vertebral laminæ

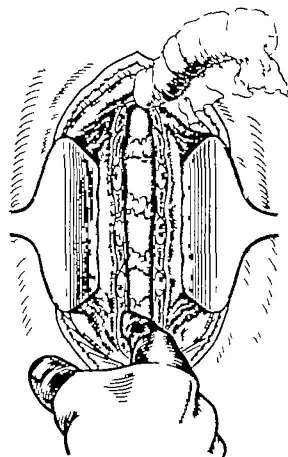


Fig 28 —Posterior Radicotomy
All the laminæ are resected some traces of the yellow ligaments are still adherent to the dura mater and should be removed. The finger explores the borders of the osseous opening to be certain there is no fragment or bony pro-

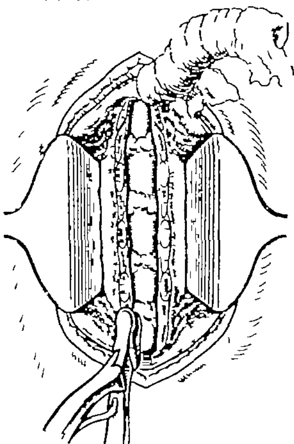


Fig 29 —Posterior Radicotomy
The gouge forceps resects a protruding part of the bone which was diminish ing the size of the opening

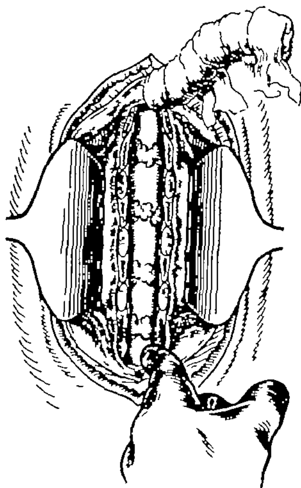


FIG 30 — POSTERIOR RADICOTOMY
Stopping the bleeding from a lamina by a piece of wax or mass of lead.

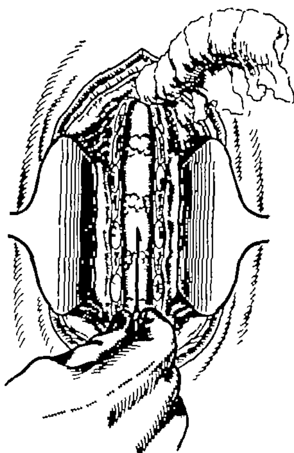


FIG 31 — POSTERIOR RADICOTOMY
Puncture of the dura mater with the needle in the spinal column

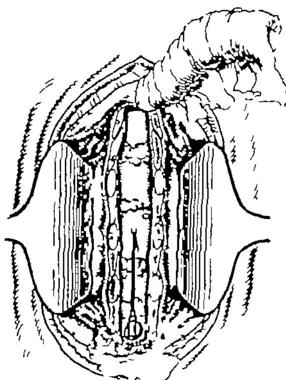


FIG 32 — POSTERIOR RADICOTOMY
Drainage of the cerebro-spinal fluid collected on a compress until it escapes drop by drop *Decompression is thus slow*

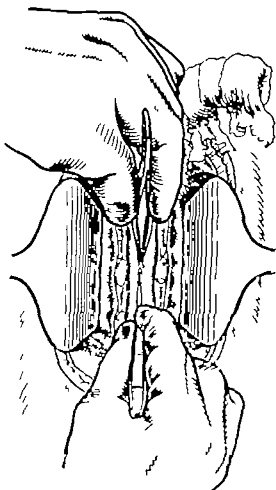


FIG 33 — POSTERIOR RADICOTOMY
The dura mater has become relatively flaccid; it is raised by a pair of fine forceps and incised by the bistoury in the middle line

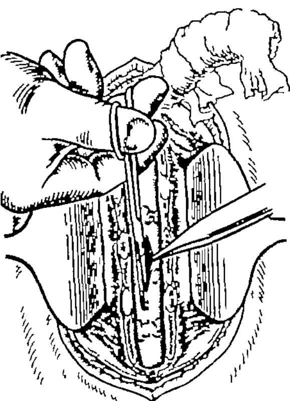


Fig 34 —Posterior Radicotomy

The incision, exactly in the middle line, is continued by scissors downwards—

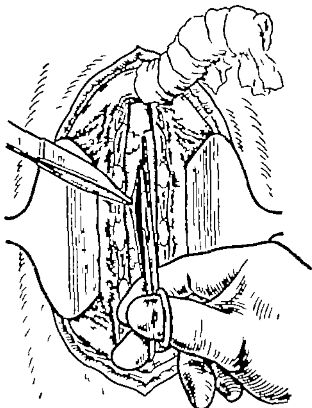


Fig 35 —Posterior Radicotomy

—then above, without reaching the ex treme limits of the osseous opening (for the convenience of the suture).

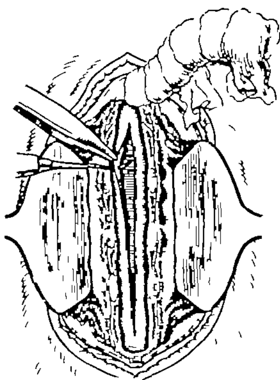


Fig 36.—Posterior Radicotomy

A fine needle pierces a lip of the incision in the dura mater near one extremity for passing a traction thread

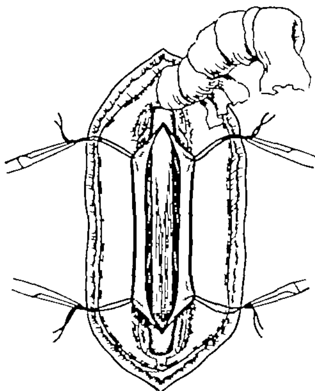


Fig 37 —Posterior Radicotomy

Four traction threads have been placed on the borders of the dura mater; they replace with advantage the retractors. The cauda equina is seen bathed in the cerebro-spinal fluid which, with respiration, flows backwards and forwards

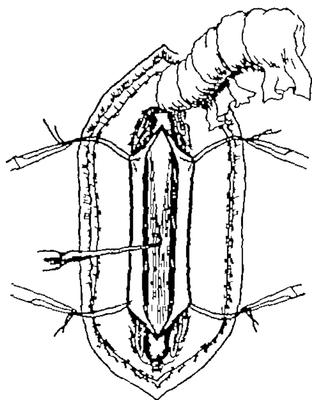


Fig 38 —Posterior Radicotomy

A strabismus hook separates the roots in the median line—

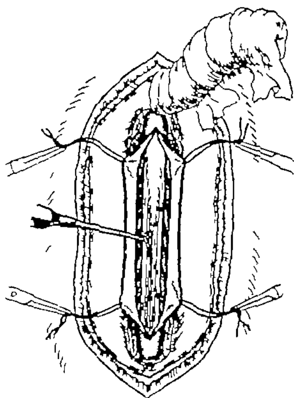


Fig. 39 —Posterior Radicotomy

—and catches the filum terminale thus separating the left roots which are to be left intact from the right ones which are to be cut.

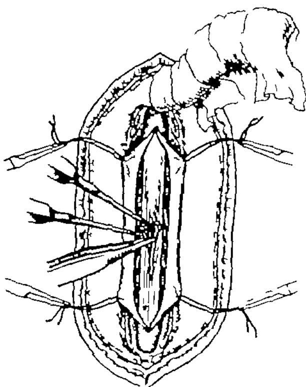


Fig 40 —Posterior Radicotomy

A second hook catches the first posterior root seen outside the filum blunt forceps irritates this root and produces no muscular shock It is, therefore a posterior root.

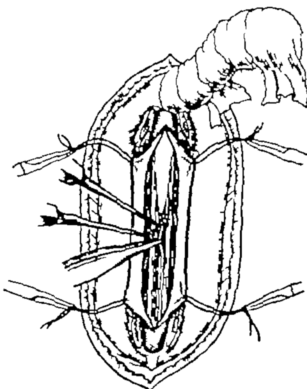


Fig 41 —Posterior Radicotomy

The next root is caught and excited in the same way All the posterior roots can be raised *en bloc* *It is better to take them* one by one: an anterior root is thus more easily avoided, and often, also the fine vessels accompanying the roots

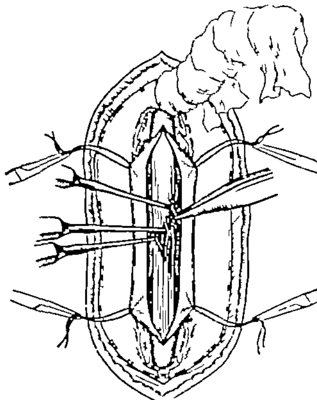


Fig 42 —Posterior Radicotomy

The bundle of sacral posterior roots with the fifth and fourth lumbars has been raised by the hook; the third lumbar is now irritated, and this produces contraction of the lateral muscles of the abdomen it is then an anterior root and must be left alone

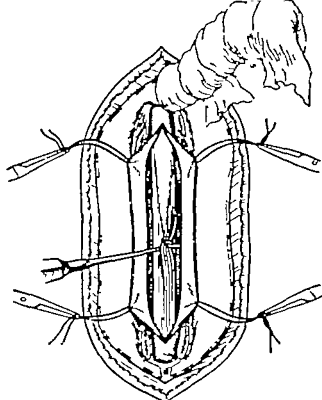


Fig 43 —Posterior Radicotomy

The bundle of roots to be cut (third lumbar to fifth sacral) is raised by the hook the filum has been discarded.

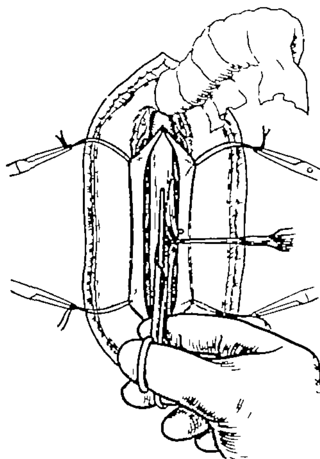


Fig. 44 —Posterior Radicotomy

Division with fine scissors of the posterior roots near their contact with the cord

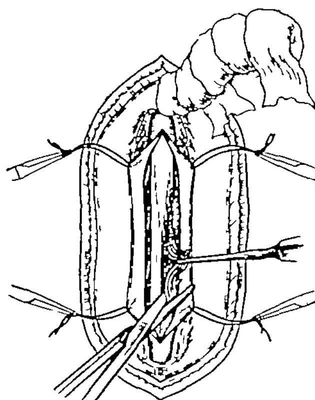


Fig 45 —Posterior Radicotomy

The hook drags on the divided roots, only held by the filaments of the arachnoid. Resection of the roots one or two centimetres below

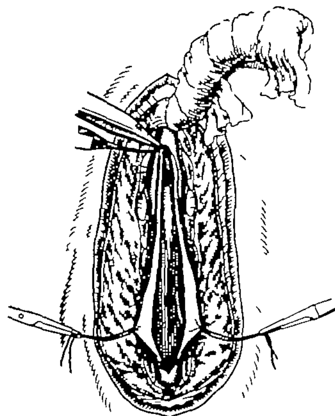


Fig 46 —Posterior Radicotomy

The operation is finished the anterior roots on the right side are seen at the bottom of the wound, if there be not too much blood in the spinal fluid A fine needle begins to suture the dura mater

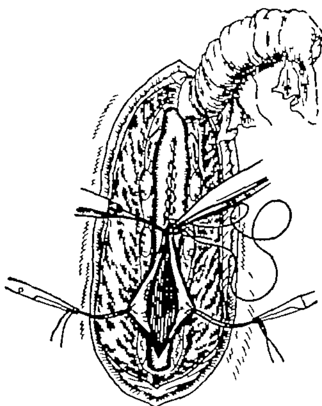


Fig 47 —Posterior Radicotomy

Closely applied stitches of a continuous suture, of fine catgut, to the dura mater



Fig 48.—Posterior Radicotomy

Finish of the continuous suture of the dura mater which should be as hermetically sealed as possible.

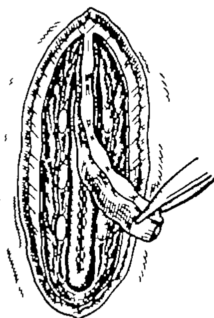


Fig 49 —Posterior Radicotomy

The flap of the spinous processes replaced; it will become engrafted without trouble The spinous processes can, also be per manently resected

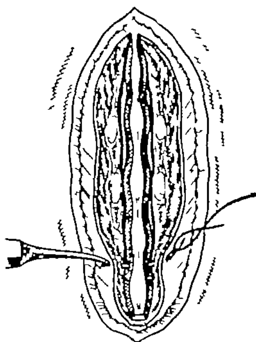


FIG 50 —POSTERIOR RADICOTOMY

The needle, with catgut pierces deeply into the lateral muscular masses it passes below the spinous processes at the level of each interspinous space, and prevents the spines from sinking into the muscular interstices on to the dura mater

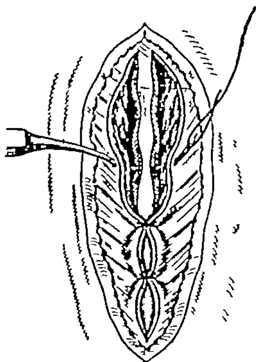


FIG 51 —POSTERIOR RADICOTOMY

The catgut is passed at the level of each interspinous space.

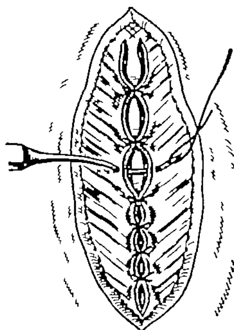


FIG 52 —POSTERIOR RADICOTOMY

Superficial intermediate stitches of catgut to bring into apposition the muscular masses, as exactly as possible

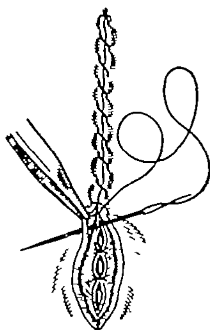


FIG 53 —POSTERIOR RADICOTOMY

Continuous cutaneous stitch of silk worm gut by a glover s needle with a triangular point the only one which pierces the skin of the back without effort the stitch brings the skin into apposition without constriction.

III

THE OPERATIVE TREATMENT OF RECENT FRACTURES

By Ch DUJARIER
Surgeon to the Boucicaut Hospital

THE operative treatment of recent fractures, which before the war was the concern of only a few surgeons, tends now to become more and more of general interest.

ADVANTAGES OF THE METHOD —The advantages of operative reduction are numerous In the first place stands perfect reduction of the fragments, which is the rule, whilst by the older methods it was the exception. Again by intervention the fibro-muscular interposition is destroyed, a frequent source of delay in ossification, or of pseudo-arthrosis

The restitution of the shape of the bone reduces to a minimum the disability of the limb often resulting from fracture. Shortening no longer exists and the same applies to angulations and rotations of the distal fragment, which may be the cause of important functional troubles.

After operative reduction there is no fear of protrusion of a fragment of bone which may be painful, from irritation of a nerve or from compression of a vessel.

INCONVENIENCES OF THE METHOD —Numerous objections have been raised against operative measures

1 *Infection* —The most serious of all is infection. If this occurred frequently, the objection would be prohibitive But nowadays, with good technique, the surgeon can almost certainly prevent it. It is well to know that it is a difficult operation, a beginning should be made with easy cases and the difficult ones not attempted until experience has been gained

Before the operation the skin must receive attention, and be shaved and phlyctenulæ treated No intervention is permissible if there be cutaneous foci of suppuration. In addition, it is advisable to wait some days after the injury before operating The bruised tissues have had time to repair, hæmorrhage has ceased, and the

power of absorption of the wound is less I think, and this depends upon the bone, there should be a delay of five to fifteen days. We should not, however, wait too long, as reduction will be more difficult, the muscles having become accustomed to their faulty position (shortening, adhesions) Again, callus is often formed early, especially in children, and in order to obtain an ideal reduction signs of fracture altered by the process of ossification should be absent.

During the operation the hands should be gloved, and only the end of the instruments should be employed. With a little practice the fragments can be brought together quite well without putting the fingers into the wound In addition, injury to the soft parts should be reduced to a minimum to shorten as far as possible the operative manœuvres necessary for reduction and coaptation. The muscular and periosteal remains of doubtful vitality should be resected with care, in a word, endeavour should be made to leave a clean wound, which has much less chance of infection.

The anatomical surfaces are to be re-formed with the greatest care, and hæmostasis should be as complete as possible. In these conditions the skin can be sutured without drainage. It is only in exceptional cases where a sanguineous discharge exists that filiform drainage with a bundle of silkworm gut should be instituted.

After the operation a moderately tight dressing should be applied. Otherwise, swelling of the tissues, which always occurs after the operation, may produce complications (pain, swelling of the extremity of the limb, gangrene) In the majority of cases, even after firm union, a plaster apparatus is advisable. This should not encircle the limb, so as to allow inspection of the wound in case of accident.

2 *Delay in Ossification* —The objection has often been made that osteo-synthesis, especially by metallic union, delays consolida tion. This is quite unjustifiable, and most often surgeons who have not had great experience in the surgery of fractures have raised it. I do not deny the delay of ossification after osteo-synthesis, but I consider, judging from a great number of operations that ossification is obtained more quickly than by the older methods. In certain subjects (why I know not) whether operated upon or not ossifica tion is slow But, for that reason, to maintain that osteo-synthesis is a factor in the delay of ossification is inexplicable. Anatomo-pathological research, for the purpose of showing that the presence of a metallic plate inhibits union, is far from convincing I have

too often seen the plates, the screws, and the bands completely surrounded by callus to attach any importance to such observations.

3 When metal has been employed, it has been objected that a secondary intervention is necessary for its removal. For my part, I believe this to be unnecessary in two-thirds of the cases When some symptom compels it (sinus, pain, etc.) the removal is often very easy, though sometimes difficult, but causes no danger to the patient.

We will not go into the details of the technique, which are particular to each fracture. We will simply say, in fractures of sufficient obliquity binding the limb with Putti Parham's steel bands is the operation of choice. In transverse fractures clips or screwed plates should be used, depending on the case, rendered firm or not by one or two bands.

Finally, in certain articular fractures screwing is the procedure of choice.

INDICATIONS FOR OPERATION IN THE DIFFERENT FRACTURES — 1 **Long Bones**—*Fractures of the Leg*—Unless subperiosteal or with slight displacement, these should be treated surgically—especially if spiral or oblique, when reduction without operation is seldom effective

Fractures of the Thigh—Operation should be performed for oblique fractures, transverse fractures with important displacement, and subtrochanteric fractures Bands or screwed plates should be used, and if the suture be firm the knee should be flexed and rendered immobile, as Lambotte proposes, the flexors of the knee being one of the principal causes of complications in fractures of the thigh.

Fractures of the Fore-arm—Fractures of the two bones of the fore-arm should nearly always be operated upon to avoid separation of the fragments and disappearance of the interosseous space. By operative reduction excellent functional results are obtained Fractures of the radius or ulna alone should be sutured, if displacement exist. Displacement of the radius, it should be noted, is often difficult to discover and when it is present there is risk of inconvenient limitation of rotation I nearly always use clips in fractures of the fore-arm, they give sufficient firmness, and their application requires only slight destruction of the bone.

Fractures of the Humerus—Operate in all cases if the radial nerve is or is likely to be injured. I have seen many cases of late radial paralysis. In fractures high up, with slight displacement, operative

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Fractures of the Humerus —Operate in all cases if the radial nerve is or is likely to be injured. I have seen many cases of late radial paralysis. In fractures high up, with slight displacement, operative

interference is not absolutely necessary Simple immobilisation gives good results Fractures of the surgical neck with marked displacement ought to be always operated upon and reduced The use of one or two clips is very easy and gives sufficient rigidity

2 **Short Bones** —Fractures of the patella ought to be sutured in nearly all instances I never employ bands, but two large silver wire sutures (1 5 or 2 mm.) These should pass into the articulation and round the lower fragment, which is often brittle, without piercing it The wires are only tightened when the fragments have been brought together forcibly by lion forceps

Fractures of the olecranon should be screwed together by Lambotte's method This is an excellent procedure, easy to carry out, and permits early use of the limb

Fractures of the clavicle should be sutured if there be any displacement. The operation is easy, and when the reduced fragments are fixed by a plate the patient ceases to suffer It is unnecessary to immobilise tightly, very soon the use of the limb can be permitted

3 **Articular Fractures** —These are often the most difficult to operate upon, but when *reduction is obtained, functionally excellent* results are secured The fractures of the inferior extremity of the femur and of the superior end of the tibia are of this kind, the same applies to the elbow

Fractures of the lower extremity of the radius and of the malleoli only require operation in cases of failure of reduction by the *usual* methods—that is to say infrequently

Since the work of Pierre Delbet, fractures of the neck of the femur —above all, the trans-cervical, but also often the cervico-trochanteric—should be screwed I have recently described my technique, it is too special to enter into details here *

* *Presse Médicale*, May 28, 1921 No 43, Technique opératoire du vissage du col fémoral dans les fractures récentes.

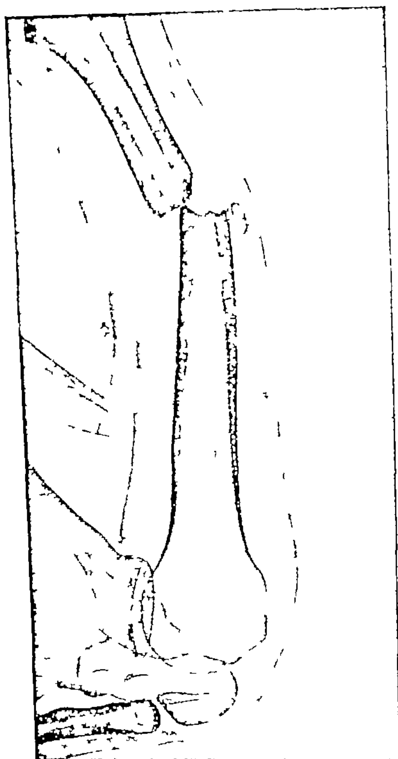


FIG 54 —FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

No trace of consolidation. Externally small intermediate fragment. Probable muscular interposition.

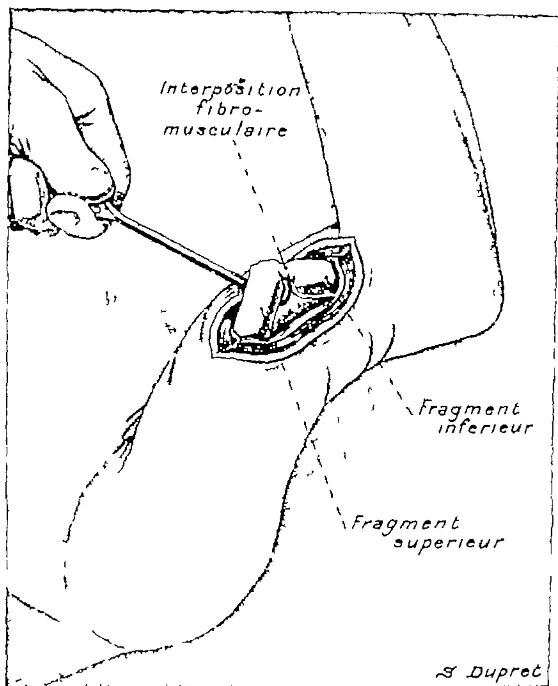


FIG 57 —FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

Lambotte's hook causes protrusion of the upper fragment and renders division of the interposition easy The arm bends like a flail

Interposition fibro-musculaire = Fibro-muscular interposition. *Fragment inférieur* = Lower fragment. *Fragment supérieur* = Upper fragment

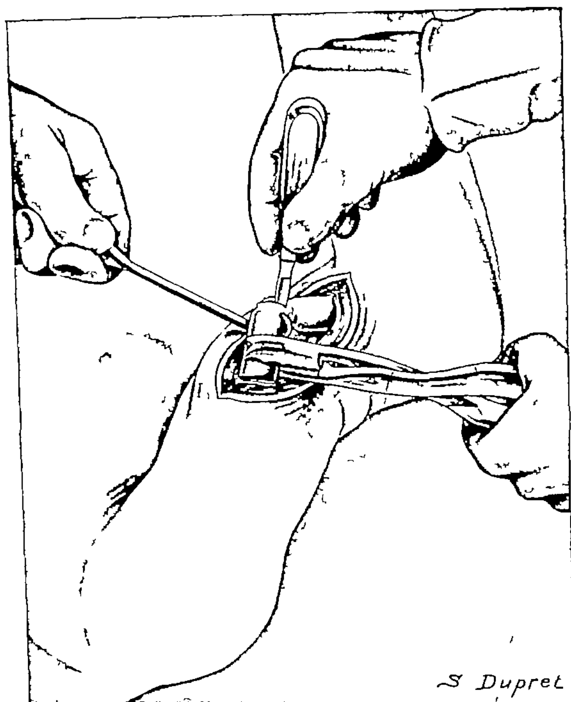


Fig 53.—Fracture of the Humerus on the Thirtieth Day
Division of the interposition.

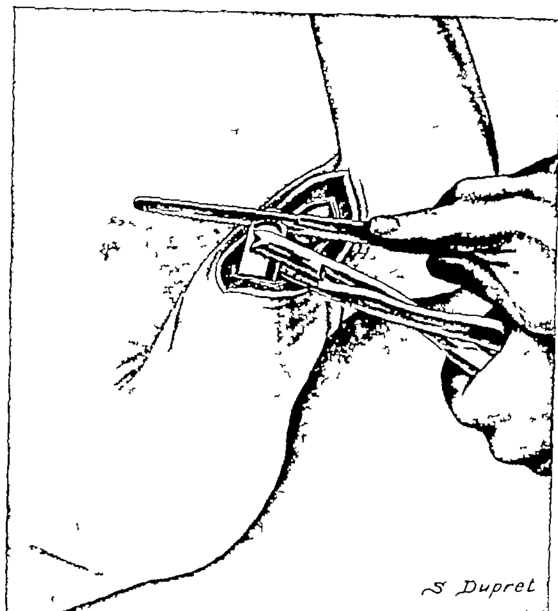


FIG 59—FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY
Lion forceps fix the upper fragment, which is refreshed by the saw

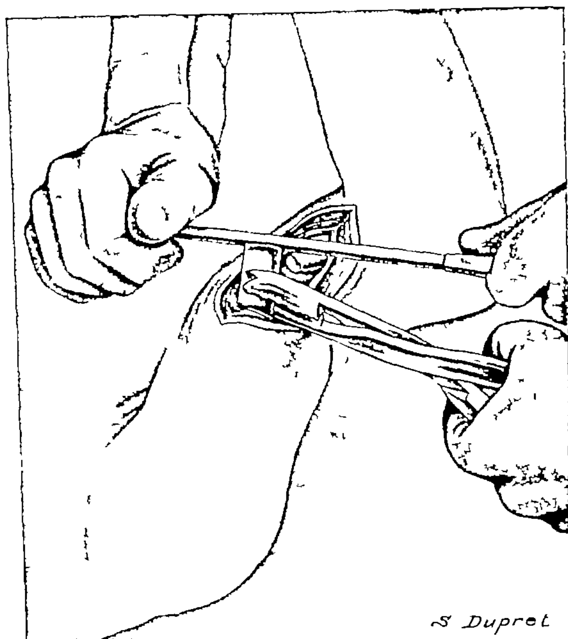


FIG 60 —FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

The division of the bone is not absolutely perpendicular to the direction of the upper fragment; this is made good by a wooden file which opens the medullary canal more than the primary division had done.

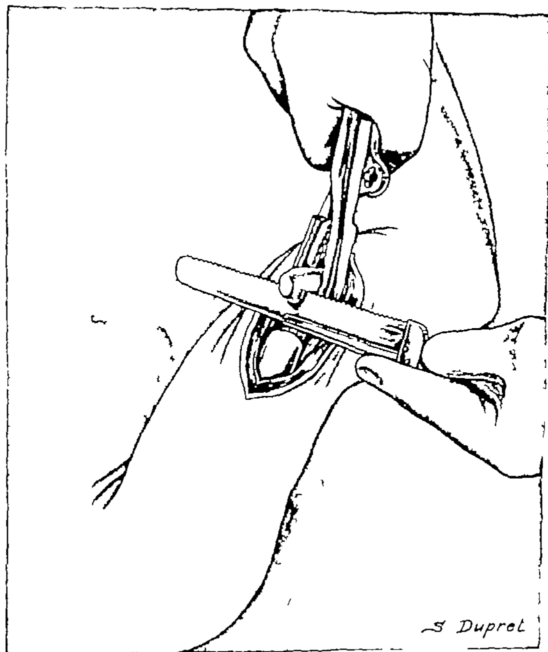


Fig 61 —Fracture of the Humerus on the Thirtieth Day

Refreshing the lower fragment.

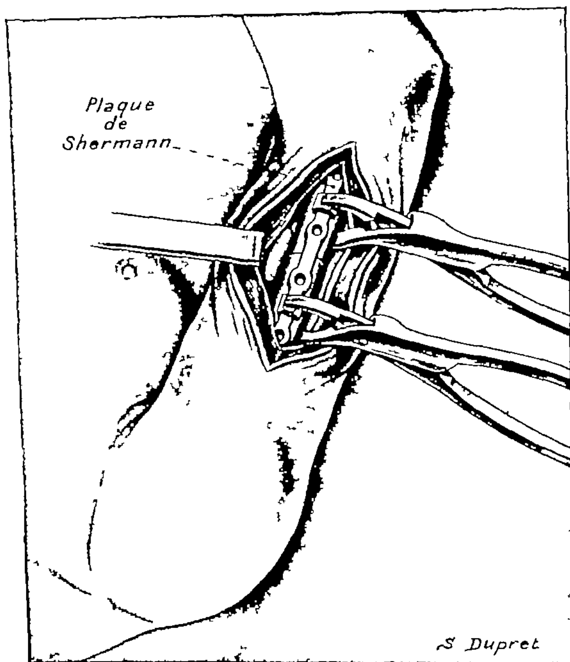


FIG 62 —FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

Reduction is obtained. A Shermann's plate is fixed to each fragment by Lambotte's lion forceps.

Plaque de Shermann=Shermann's plate.

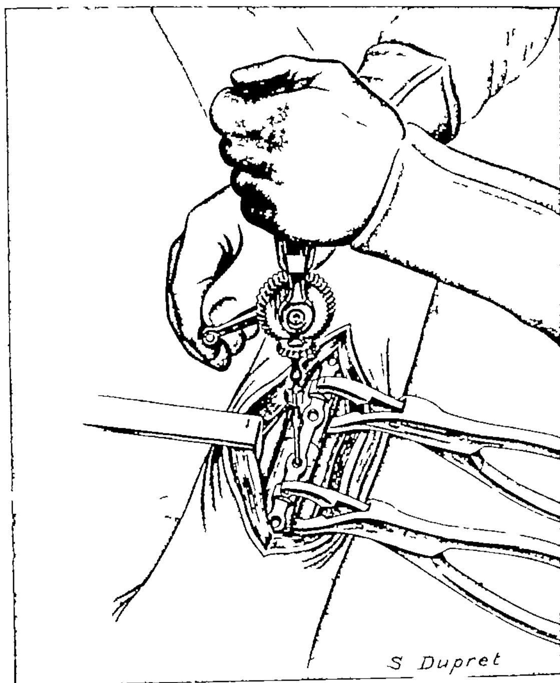


FIG 63.—FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

The perforator makes a hole for the screw

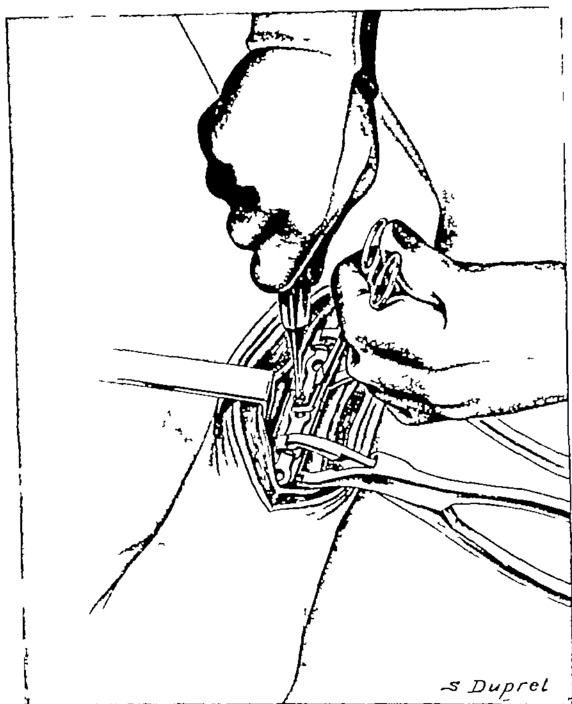


FIG 64 —FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

A screw held by forceps is screwed in by the screw-driver Nothing used in prosthesis is to be touched by the hands, even if gloved.

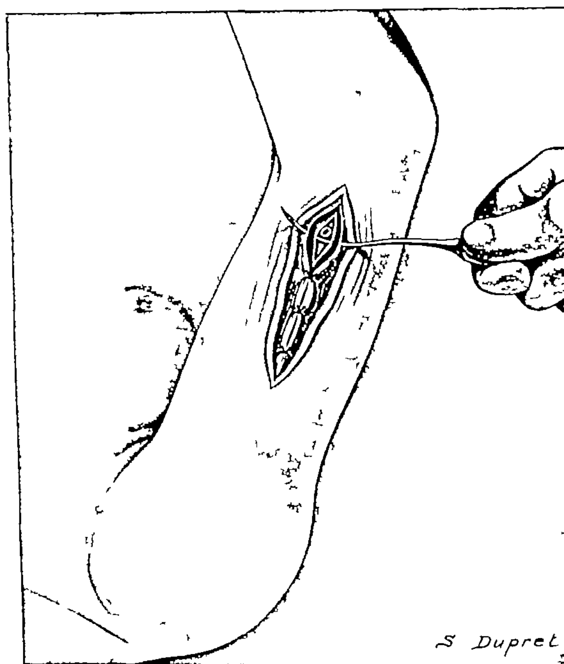


FIG 66.—FRACTURE OF THE HUMERUS ON THE THIRTIETH DAY

Catgut brings the muscular and periosteal surfaces together The skin will be sutured by linen thread, without drainage.

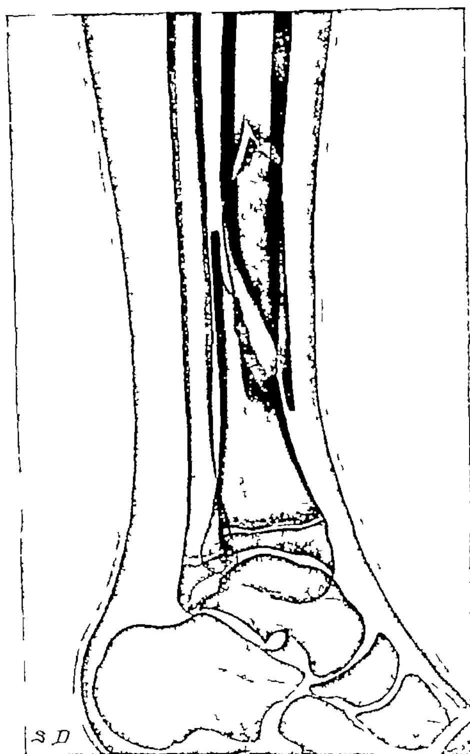


Fig 68.—Spiral Fracture of the Leg with Large Intermediate Fragment in a Boy aged Fifteen Years.

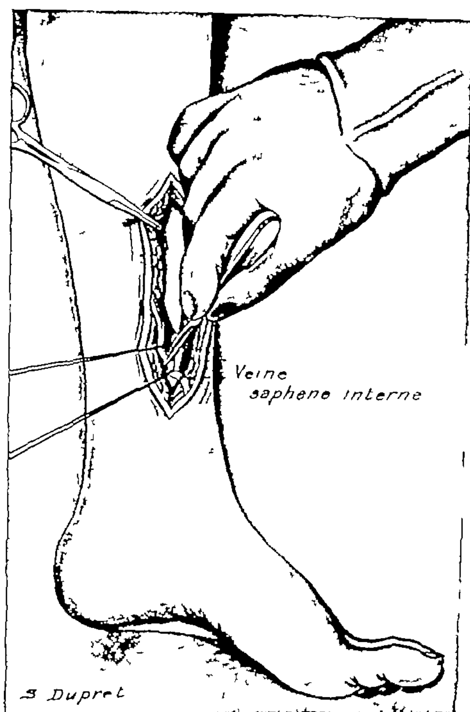


FIG 69.—INCISION ON THE INTERNAL SURFACE OF THE TIBIA
Division of the internal saphenous vein between two ligatures

Veine saphène interne=Internal saphenous vein.

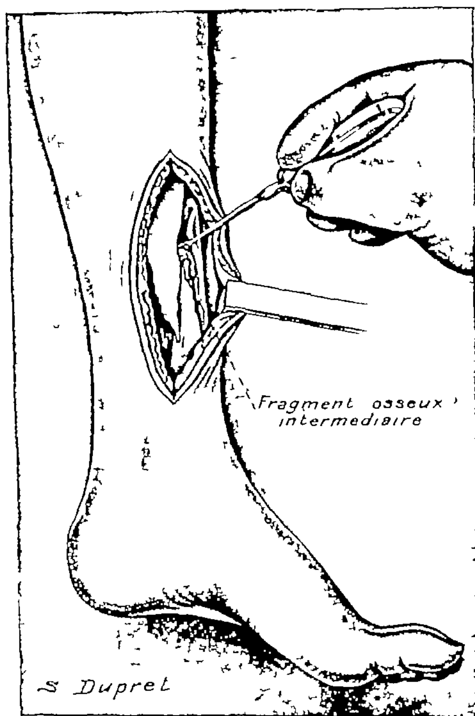


FIG 70

The site of the fracture is exposed. The curette cleans the fractured surfaces of adherent clots.

Fragment osseux intermédiaire=Intermediate osseous fragment.

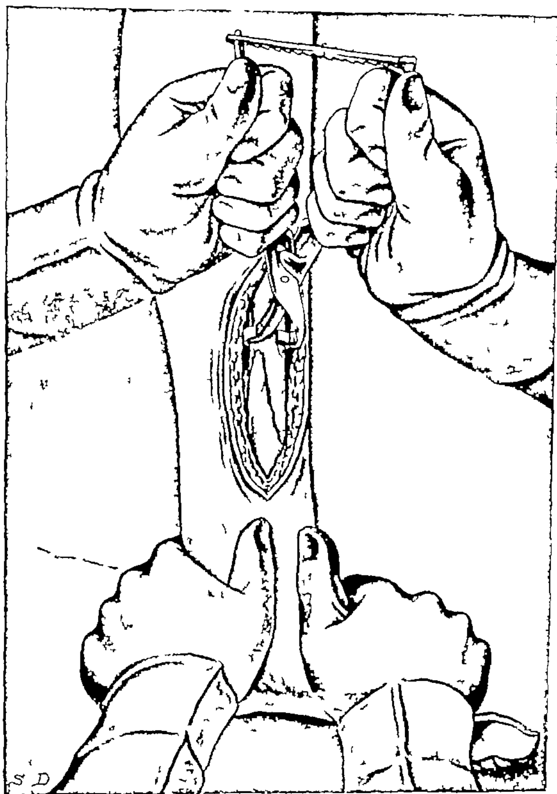


FIG 71

An assistant pulls on the foot with both hands. Lambotte's lion forceps fix the inter mediate to the upper fragment. The fracture has thus only two fragments.

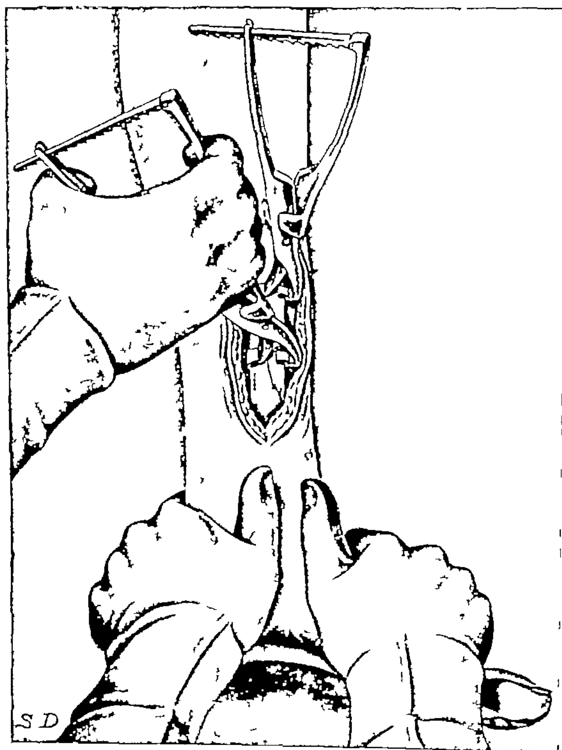


FIG. 72.

Reduction of the lower fragment is exactly obtained A second Lambotte's forceps fix it

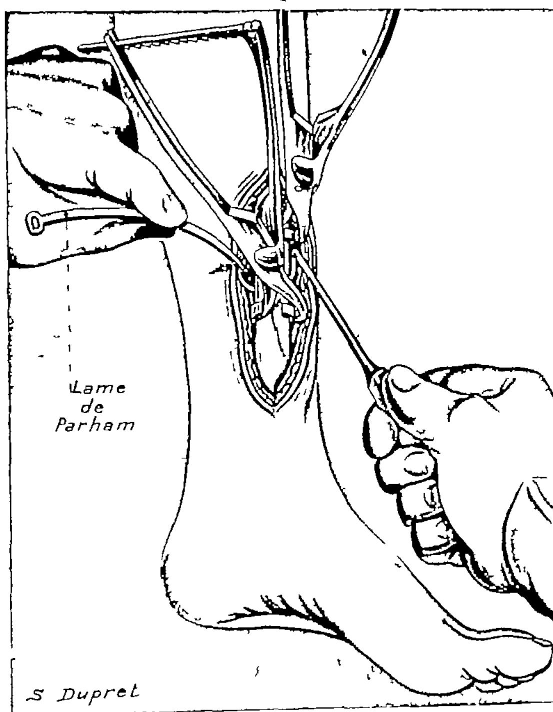


Fig 73.

The curved needle is passed behind the tibia to hold a Putti-Parham steel band.

Lame de Parham=Parham s steel band.

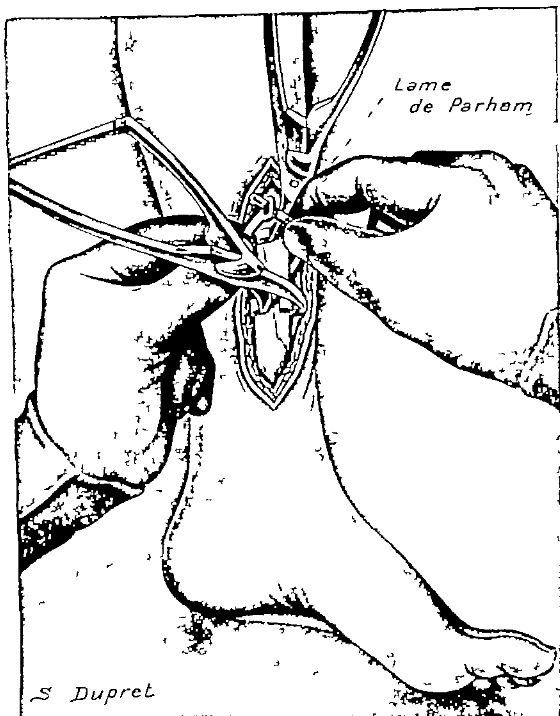


FIG. 74
The end of the band is introduced into the eyelet

Lame de Parham=Parham's steel band.

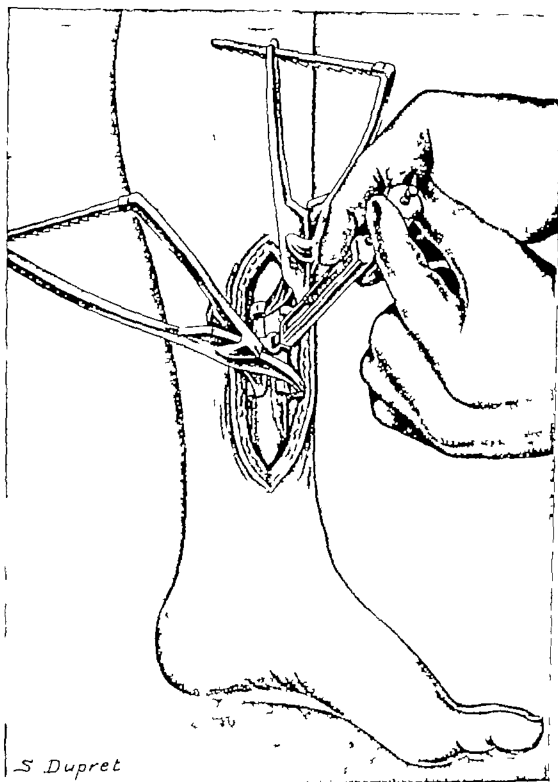


FIG 75

The band is tightened fixing the intermediate to the upper fragment.

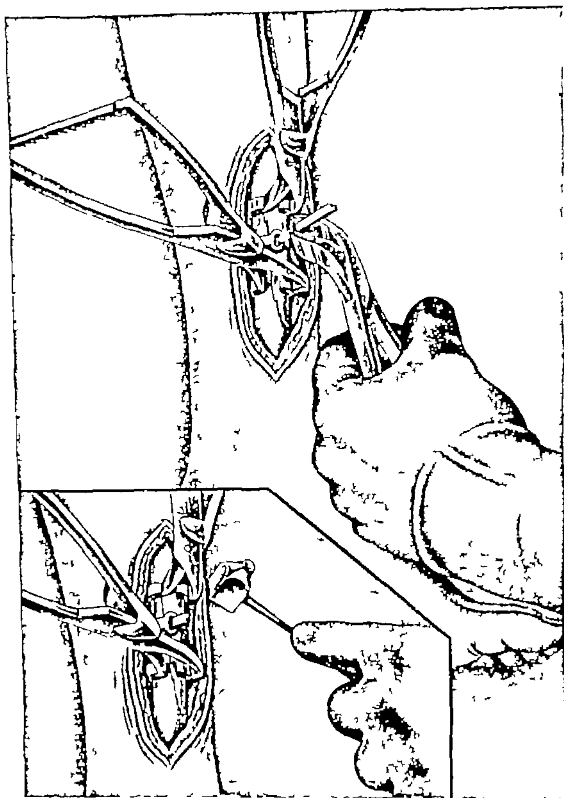


Fig 76.

The band is cleanly divided with forceps. In Fig 76 *bis* the mallet flattens the divided end against the bone.

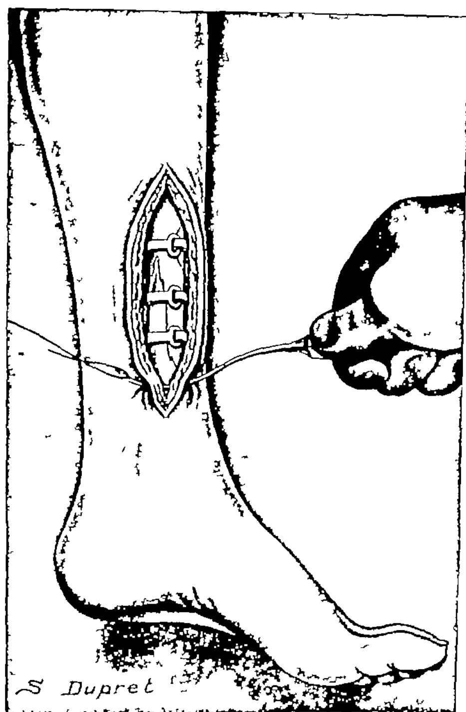


Fig 77

Two new bands have been inserted; the tibia is integrally repaired and the three bands assure very firm coaptation The wound has begun to be closed at one level.

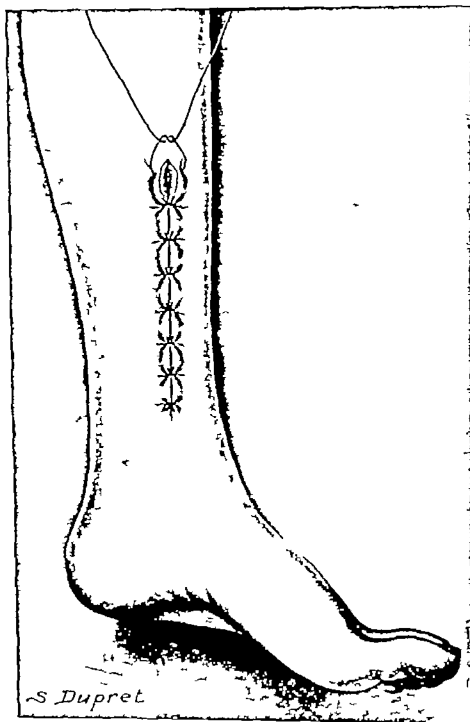


FIG 78.
The wound is sutured without drainage

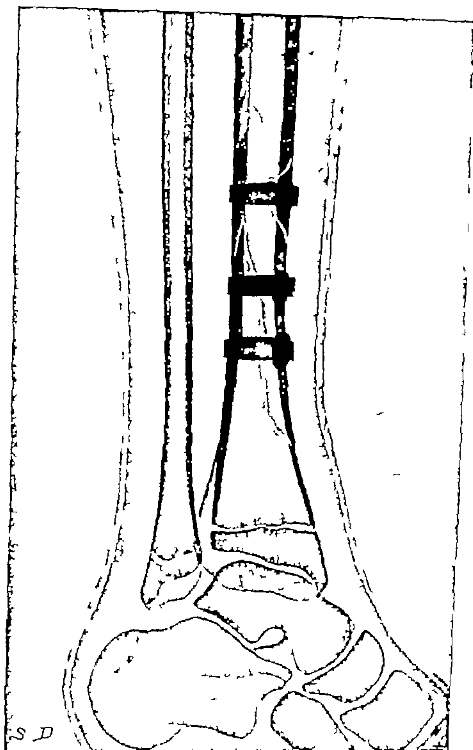


Fig 79

Appearance of the fracture after operation Some days after the operation an apparatus for walking invented by Pierre Delbet was applied. The patient walked on the twenty fifth day The apparatus was removed on the for[illegible] The functional result was excellent.

IV

CANCER OF THE TONGUE

CANCER of the tongue is a serious cancer There is reason to hope, however, that treatment by radio-active needles and by early operation, without a period of waiting and hesitation, will improve the prognosis

The early diagnosis is, in fact easy, the disease soon attracts the patient's attention by the discomfort it causes, and the pain it provokes, it may be spontaneously (otalgia) or by friction against the teeth Most often it develops at a visible and tangible part sometimes, no doubt, it can arise in the body of the organ, under the mucous membrane, but this is rare, and even here it does not long remain unnoticed. Unfortunately some doctors hesitate to come to a decision if the diagnosis be uncertain, and cause injury to the patient by wasting time. They commence a trial treatment, consisting in the removal of a stump of a tooth, or by an antisyphilitic cure. Certainly, the great majority of cancers of the tongue are "specific ", it is not astonishing, then, that some patients admit having had syphilis or that Wassermann s test is positive, but it is, nevertheless a mistake to give a trial to medicines, as time is lost It is a wise thing to remove a dental stump if it irritate the tongue, and it is not bad treatment to give antisyphilitic remedies to a patient with a positive Wassermann, but what is absolutely necessary is without delay, to excise a fragment of the tumour, under local anæsthesia, and to make a histological examination. The urgency of biopsy should exclude cauterisation and all local applications, these remedies are wrong and only serve to quicken the growth of the lesion to cause suffering to the patient, and to waste time.

It is so rare for a suspected ulceration opposite a dental stump, not to be cancer that practically no account should be taken of the ultimate result of a purely traumatic lesion Cancer should be accepted as the diagnosis from the beginning, of the tongue as of the breast.

Lingual cancer develops nearly always on leucoplakia, often of long standing, which has or has not been noticed by the patient.

It is of syphilitic origin. Smooth leucoplakia changes into the verrucose form, which is the first stage of cancer

Note the four rules of Sébileau *

1 Every patch of recent leucokeratosis on an indurated base is a surgical cancer, which should be removed immediately

2 Every patch of smooth leucokeratosis which is becoming warty is a histological cancer, it should be removed *immediately*

3 Every improvement which follows anti syphilitic treatment *of warty leucoplakia is a dangerous illusion*, and *causes loss of time*. There should be no waiting for this result, operation should be performed immediately

4. Every lesion of the tongue, of which the diagnosis of innocency is not absolutely certain, or even if there be a suspicion of malignancy, ought to be submitted to biopsy, and this latter should be total ablation of the lesion. Lingual cancer is a serious, rapidly growing cancer, because the tongue is very rich in lymphatic spaces—*i e*, ready to convey cancerous elements, and having numerous and intimate connections with neighbouring organs, to which the cancer tends rapidly to spread

Generally, in the small, circumscribed and superficial growth the eye perceives, the finger detects a long track of induration. If it have been removed for a large biopsy, or even by an operation thought to be sufficient, the histologist discovers in the preparations some neoplastic cells at the limit of the section. Cancer attacks the glands with rapidity Moreover, the tongue is a centre of muscles from all parts of the buccal cavity It is continued by the said muscles and by the mucous membrane with the floor of the mouth, the palate, pharynx, and the tonsils Thus, very rapidly, cancer of the tongue encroaches on the neighbouring structures. Clinically it can be divided into three varieties

(*a*) Cancers of the anterior or mobile part

(*b*) Cancers of the vertical or posterior fixed portion

(*c*) Inferior cancers those which have a tendency to spread to the buccal floor

As a general rule, anterior cancer should be operated upon intra orally, posterior cancer by the submaxillary route with removal of the glands on both sides, inferior cancers by the trans-mandibular route.

This *frequent and rapid dissemination* of lingual cancer to the

* Le Traitement du Cancer de la Langue, by Pierre Sébileau 28^e *Congrès français de Chirurgie*, Paris, 1919

neighbouring regions makes the prognosis worse from the first, owing to the mutilating operations required, and also to the site, nature, and function of the adjacent organs affected. From the moment the surgeon attacks the isthmus of the fauces and the opening of the throat the amputation takes on a character of great gravity, since to root out the disease an open and suppurating wound is made in a vital space, which the operation transforms into an infected cavity, here the pus, the discharges from the nose and from the mouth accumulate and are absorbed by the vessels of the neck, are swallowed by the œsophagus and inhaled by the trachea It is this that justifies what J L. Faure said one day to Sébileau Cancer of the tongue is not more serious in itself than any other, but what gives it what I attribute to it, a particular malignity is that the cancer we usually see in this part we cannot often remove without killing the patient

Does radium treatment give any results? We are of the opinion that in the future radium used in the form of needles plunged into the diseased tissues of the tongue and the healthy tissues in the periphery of the tumour, before any lymphatic infection and combined or not with energetic radiotherapy of the surrounding glands, will give good results, but actually at the present time surgical treatment ought to be given the preference, and that without delay

Surgical Treatment.—Every removable cancer of the tongue should be operated upon if the conditions be suitable. The only obstacle to the operation is the impossibility of removing the whole mass of recognisable disease. It is only if the surgeon consider he cannot pass freely beyond the invaded areas he should have recourse to treatment by radium and the X rays. To discover the limits of the disease he should use not only his fingers and his eyes, but also his brain—*i e* find out as far as he can the likelihood of peripheral invasion Around the perceptible lesions the operator must allow for those that escape him, and therefore he must operate extensively Without doubt some very large extensive and mutilating removals give a high mortality from cardiac failure or septicæmia but sad as this is, we have nothing better

Should we Operate on the Very Serious Cases, entailing Enormous Risks, which Threaten to Return Rapidly, and Bring Discredit on Surgery?—We think not. Sébileau considers the following conditions are contra indications

(*a*) Extension of the disease to the glosso-epiglottic fold and to the epiglottis

(*b*) Primary or secondary invasion of the pillars of the fauces and of the tonsils

(*c*) Deep infiltration of the body of the maxilla.

(*d*) Inflammatory and badly circumscribed glandular enlargement

Should the Whole or Part of the Tongue be Amputated?—This depends on the case Every posterior cancer should be treated by total amputation and the same applies to an anterior cancer, *reaching the middle line*

Partial amputation is suitable to a cancer localised to one of the borders of the organ, where it has remained for some months, but it must be excised widely

Should the Glands always be Removed?—Yes, whatever the localisation of the cancer, the glands must be extirpated widely and thoroughly the cellular and fatty tissues surrounding them and the salivary glands in contact with them (submaxillary gland) should be removed. Doubtless all the existing glands are not excised, but *the chances are much greater that the infected glands have been* extirpated

Should all the Lymphatic Fossæ of the Neck be Emptied?—No, because this large excision does not prevent recurrence, it is impossible to know at what height the lymphatic chain ceases We can never be sure of clearing out the glands entirely Removal should be extensive, and each group of glands removed as a whole The cervical aponeurosis, the cellular tissue the glands, the submaxillary gland should be excised *en bloc* beginning behind at the sternomastoid, and continuing in front up to the limit of the area considered suspect.

Removal of the Tongue Intra-orally—All lesions of the anterior half of the tongue ought to be reached by the mouth, very often it is necessary to enlarge the opening Free the tongue cut the anterior pillar and the frænum and divide one or both commissures This clean and rapid division of the cheek is to be made by a bistoury on one side only, the incision ought to be horizontal to avoid Steno s duct It does not make the operation worse, and leaves so to speak no trace if on suturing the wound care is taken to bring into apposition the edge of the labial commissure and to ensure the continuity of the skin and mucous membrane

Do not try to remove intra-orally cancers of the posterior part or those which invade the floor of the mouth Cancer of the root

of the tongue is a dreadful disease. It spreads rapidly to the submental glands, invades the floor of the mouth, and reaches the posterior surface of the jaw These cases require operation by the trans-mandibular route. But some inferior cancers can be removed intra-orally as follows the jaw consists of two strata superimposed, separated by the mylo-hyoid muscle, the lower belongs to the neck, the upper to the mouth Certain cancers of the root adhere to the periosteum of the maxilla, but only above on its buccal part It is sufficient, then, removing at the same time the soft parts of the mouth, to make intra-orally a more or less large resection of the alveolar layer By a large operation, with division with a saw, bone and diseased tissues can be removed in one, after division of the lower lip in the middle line to give daylight.

Removal of the Tongue by the Submaxillary Route—Lesions of the posterior half of the tongue ought to be approached by this route, between the horizontal limb of the inferior maxilla and the great cornu of the hyoid bone. Lesions close to the tonsils or epiglottis can thus be reached. The route may be taken either between the two bellies of the digastric or behind the anterior belly, after cutting the posterior one which gives greater access to the whole of the region, the floor of the mouth is divided and the tongue drawn out *in toto* The operator who has exteriorised the tongue should explore it in its entirety by sight and fingers—especially the latter—an easy exploration—directly the anterior muscular attachments at the genioid tubercles have been divided

Removal of the Tongue by the Trans-mandibular Route.—If the operator foresee difficulties in the exteriorisation of an anterior lingual cancer which is adherent to the floor of the mouth, they disappear after median maxillary osteotomy If these difficulties exist in a posterior cancer, they yield to a paramedian osteotomy

(*a*) *Median Route*—The floor of the mouth is infiltrated, the tongue sometimes adherent to the maxilla, is bound down and does not yield to traction intra-orally The surgeon should split the jaw by a median or paramedian incision sometimes even by a double bilateral vertical incision, with resection of the intermediate osseous segment. In the first case, the operation opens the way to the growth in the second exeresis is performed as well. When the first operation is carried out once the bone is divided, the two limbs should be separated, and the diseased tissues removed In the second applicable to tumours which have grown into the bone

the mandibular arch and the soft parts adherent to it should be excised *en masse*

(*b*) *Lateral Route* —The operator should divide the maxilla far from the lesion but outside the median line The purpose of this paramedian division is to expose the space between the tongue and the tonsil. After division, the bone is to be separated from the muscular attachments on the internal surface of the horizontal limb, then the bony half of the diseased side abducted and raised, the internal surface of the corresponding cheek elevated and the isthmus faucium uncovered, large operations can be carried out in this way

PRE-OPERATIVE PRECAUTIONS —Before operating, the patient should go to the dentist for the teeth to be scraped, caries removed, and all source of a buccal infection got rid of, the patient should rinse out his mouth as frequently as possible with oxygenated water

ANÆSTHESIA —*We employ regional anæsthesia, as described in* the book "Anesthésie régionale."* To obtain complete anæsthesia *in cases of extensive resection the technique demands a certain* amount of experience When the operation is performed in two stages anæsthesia is always easy, it is sufficient for the lingual stage to infiltrate the base of the tongue by the subhyoid route, for removal of the glands cervical anæsthesia in the second stage is equally easy and efficacious For intervention by the submaxillary route the same anæsthesia suffices, the dose of the anæsthetic must be larger and sometimes a nervous trunk escapes the syringe, the anæsthesia can be completed during the operation making use of a strong solution (2 per cent.) If the surgeon cannot use regional anæsthesia, he may employ general spinal anæsthesia (La Filiatre's method) This latter permits of extensive operations without pain or difficulty The two methods are superior to narcosis The prognosis is better and the operation more easy than with narcosis.

Is it Necessary to Tie the External Carotid Artery?—We tie it, of course when clearing out the glands of the neck We make a Y incision on the skin, the angle of which embraces the lower border of the jaw We remove the glands the cervical aponeurosis and the submaxillary glands whilst dissecting in front of the external carotid this is tied so that we continue to empty the submaxillary

* "Anesthésie régionale," Victor Pauchet, Sourdat and Labat (Editor Doin Paris, 1919)

region without there being any hæmorrhage. In order not to mistake the artery, it should be tied just below the point where it is crossed by the hypoglossal nerve As a landmark, look for the posterior belly of the digastric, which corresponds to the point where it should be tied. Do not delay by searching for the great cornu of the hyoid, which, like the trachea, changes its place during rotation of the head Do not waste time over the thyro-linguo-facial venous trunk which has to be tied. Beware of the superior thyroid artery, which must not be taken for the carotid Pull back the sterno-mastoid after having freed its anterior border and deep surface. Place in the upper angle of the wound a Farabœuf's retractor, look well at the posterior belly of the digastric, the hypoglossal emerges from its deep surface, follow the nerve to where it crosses the external carotid and tie the latter near the nerve.

Technique of the Operation —*Removal intra-orally*

(*a*) The surgeon ought to operate by this route on cancers which appear capable of removal by this way, for the operation is not a serious one.

(*b*) When operating in one stage, remove the glands first, and then the tongue.

(*c*) If in two stages begin by removing the tongue, unless a ligature be desired, then begin with the glands.

Extirpation of the Tongue.—Draw on the tongue by a large thread passed into the tissue behind the lesion, as near as possible to the base, and not in front of the growth at the point. By doing this a large field is exposed, and in case of hæmorrhage secure traction is obtained behind the cut edge.

What Quantity of Parenchyma should be Removed?—A good finger's breadth more than the palpable lesion On the dorsum of the tongue it may be necessary to go past the middle line. On the under surface, the mucous membrane of the floor has often to be sacrificed posteriorly it is necessary to go far, as it is there that future danger arises. The operator must not save material for the suture he must excise extensively, he must suture as he can, tongue to tongue, or tongue to buccal mucous membrane.

Removal of the Glands —The operation should include the three groups of glands—submaxillary, prejugular, and retrojugular At the same time remove the submaxillary gland and the peri-

vascular cellular layers The neck is to be drained for twenty four hours with a bundle of silkworm gut.

PROGNOSIS —Amputation intra-orally is not a serious operation. *It is rare for general or pulmonary infection to occur*, there is little fear of secondary hæmorrhage When the operation is completed by resection of the *upper part of the jaw, it is more serious* Fever and slight general infection are noticed The operative field is bathed in an abundant saliva, sloughs form, cure is, however, usual, but adhesions between the jaw, tongue, and floor of the mouth occur, preventive polyvalent serum is useful.

Amputation by the submaxillary route is much more serious the patient is always febrile, and more or less suppuration occurs. It is wise to feed by a *nasal sound*, which *prevents malnutrition* and diminishes the risks of infection. The larger the portion of the tongue removed, the more extensive the resection of the buccal floor, the more posteriorly the operation extends the worse the prognosis, in other words, the gravity of the prognosis depends on the amount of the structures removed When amputation passes the tonsillar region, above all if osteotomy be performed, the *mortality increases considerably* Pre-styloid *is less serious* than pre-styloid and retrostyloid bucco-pharyngostomy, but the gravity of the operation depends, above all, on the condition of the patients. They are often aged, suffering from arterio-sclerosis badly nourished, of low morale, drinkers, and with a weak nervous system, above all, fear pale men of a leaden and earthy tint with ulcerating cancers. They bear, perchance, intra-oral amputation, but die from the sub- or *trans maxillary operation* They die of their age from the heart, vessels, from infection from cancerous intoxication, insomnia, and hunger Shock and collapse likewise kill in twenty four or forty eight hours, or septicæmia eight days later, the latter betrays its presence by broncho-pneumonia or gastro-intestinal poisoning, this may be *slow and only occur at the end of a month*

Sébileau gives the following mortality

Intra-oral 5 per cent., submaxillary 30 per cent., transmandibular 40 per cent.

A large cervical opening, frequent dressings and copious irrigations lessen septicæmia of the tissues and veins. *Extensive lavage* of the bucco-pharyngeal cloaca the dependent position of the *head for the first few days* the local anæsthesia, and injections of polyvalent serum also contribute to increase the chances of success

What are the Results?—Some cases, verified histologically, have been cured, 40 per cent. after three years, according to Collins Warren, at the end of five years, only about 15 per cent. Without doubt, some cases have lived from fifteen to twenty years To sum up endeavour should be made to perform small operations at the very beginning of the disease, the prognosis is then excellent

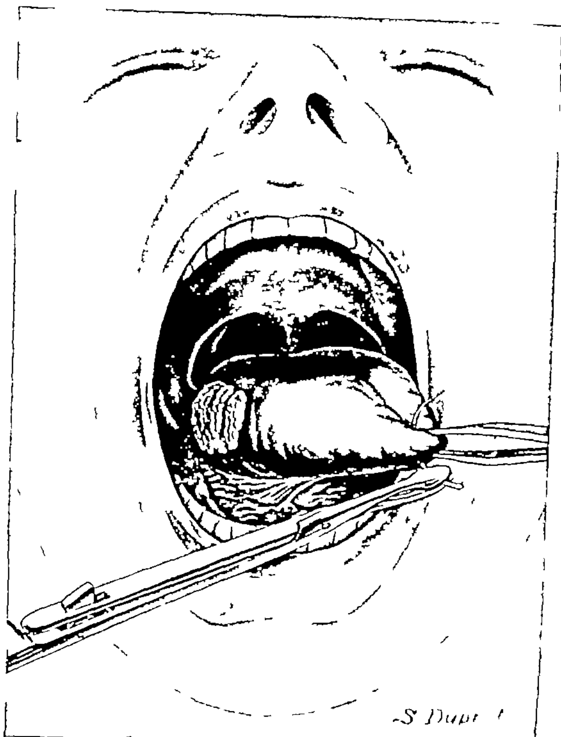


FIG 82 —CANCER OF THE TONGUE. SECOND STAGE.

Passing a traction thread into the point of the tongue This figure ought to be reversed We have preferred to place it in this position so that it could be easier understood A curved needle on a Dartigues needle-holder pierces the tip of the anæsthetised tongue and conveys a thread to the assistant who drags the tongue outside the mouth Local anæsthesia often allows the tongue to be protruded without assistance through

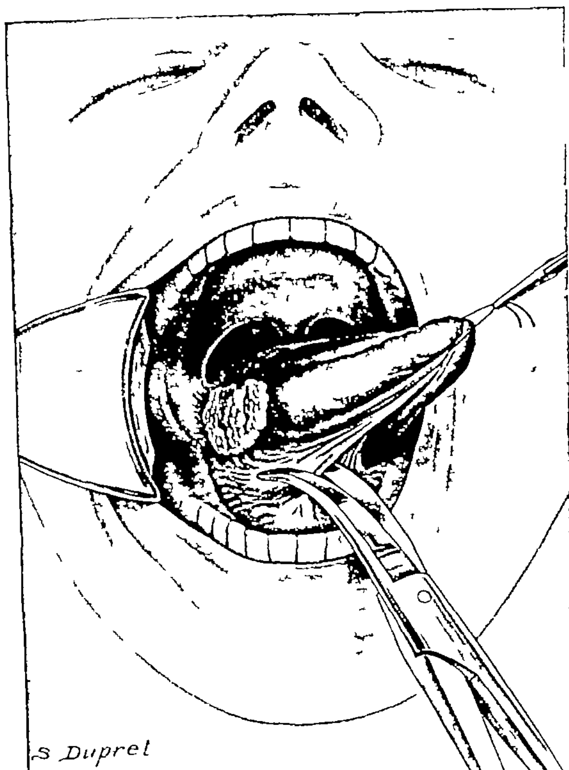


FIG 83.—CANCER OF THE TONGUE. AMPUTATION SECOND STAGE.

Division of the frænum Traction by silkworm gut and separation by a vaginal speculum render the tumour visible. Usually it is necessary to cut the labial commissure

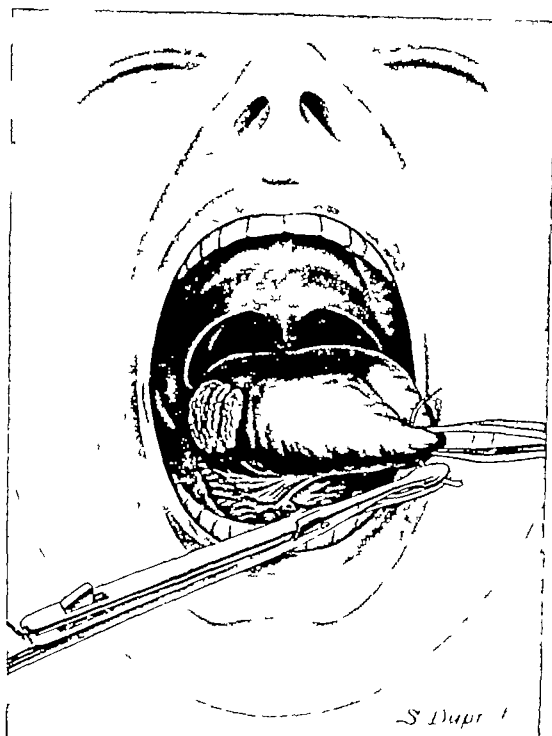


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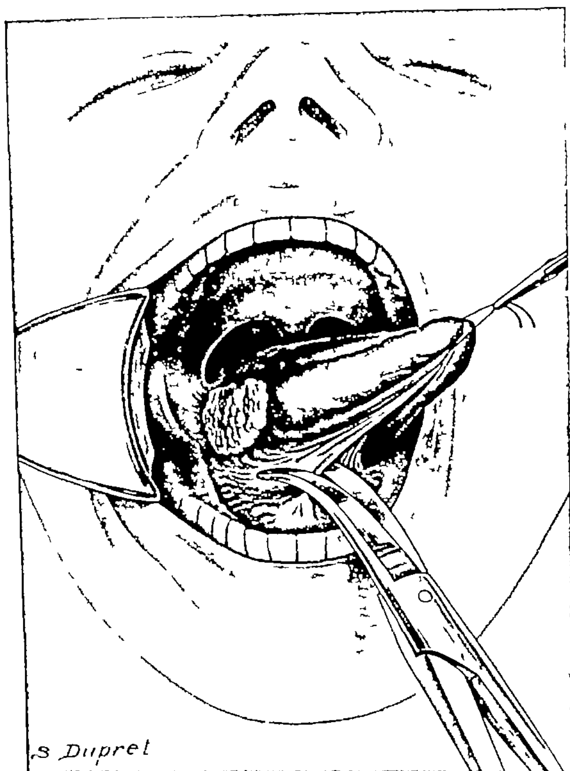


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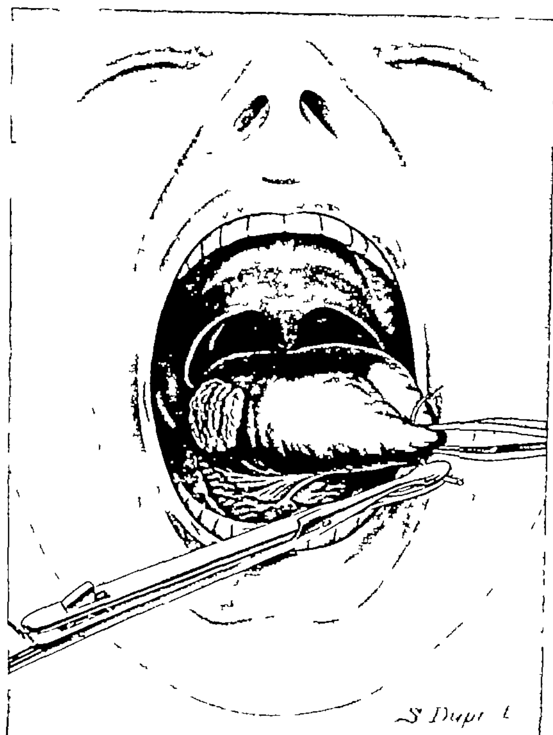


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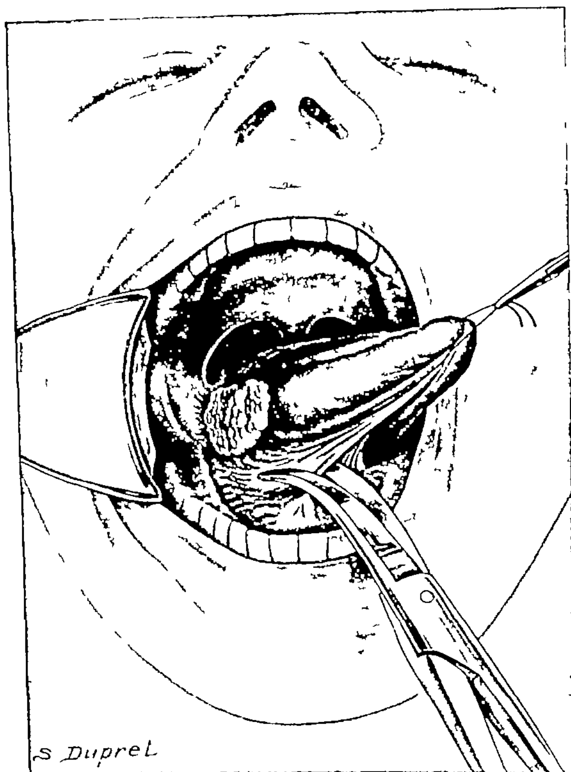


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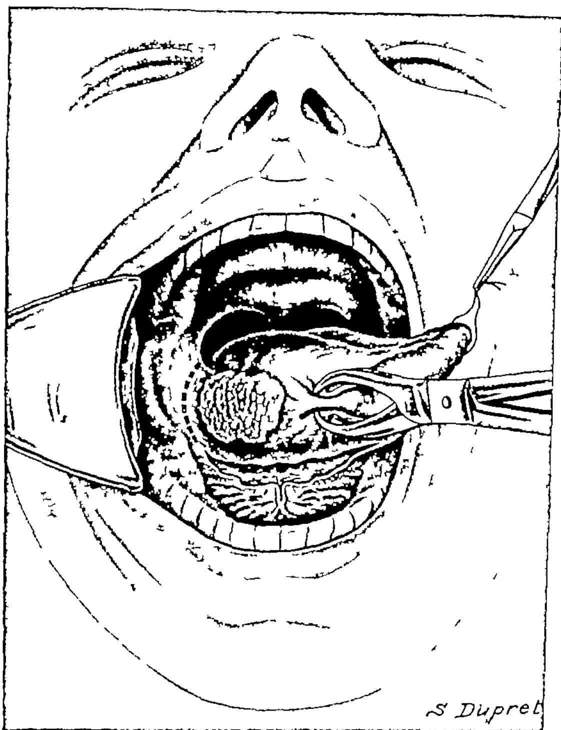


FIG 84 — CANCER OF THE TONGUE. AMPUTATION SECOND STAGE.

Division of the anterior pillar In order to bring the tongue as far as possible outside the mouth the operator has divided the frænum and anterior pillar following the dotted line. Forcible traction on the lingual border by tissue forceps 1 centimetre in front of the tumour

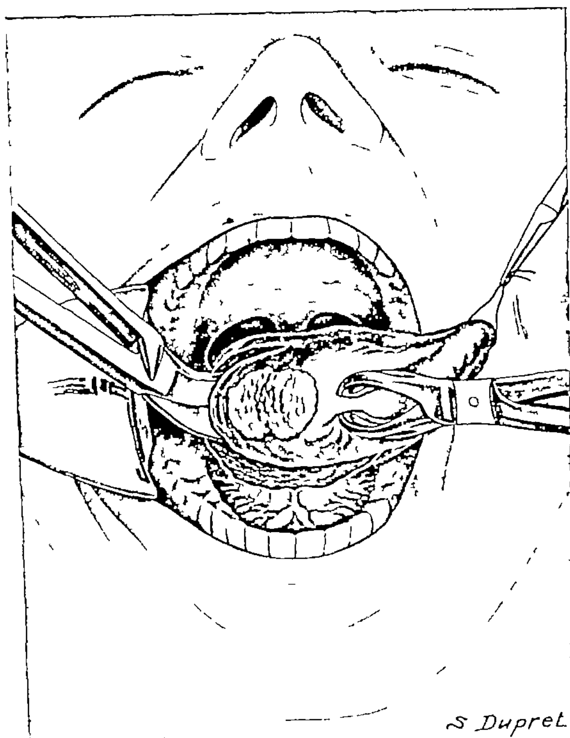


FIG 85 —CANCER OF THE TONGUE. AMPUTATION SECOND STAGE.
The curved scissors divide the tongue as far back as possible

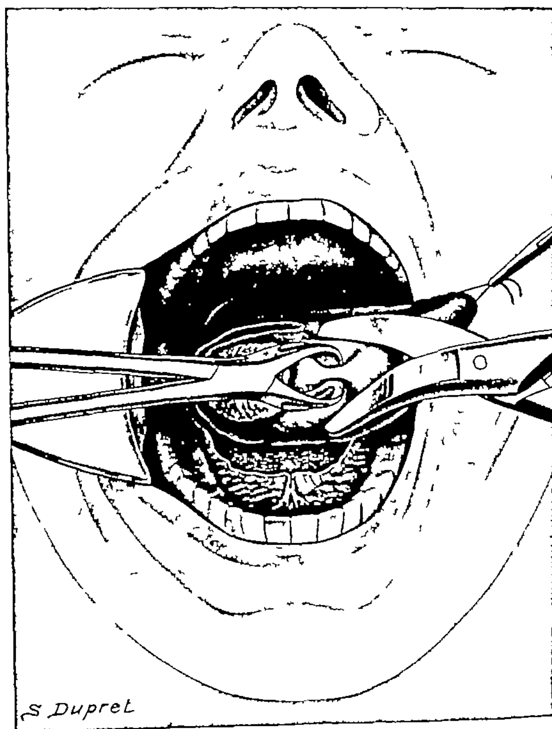


FIG 80.—CANCER OF THE TONGUE. SECOND STAGE.

Division of the lingual triangle by curved scissors in front of the tumour and of the tissue forceps.

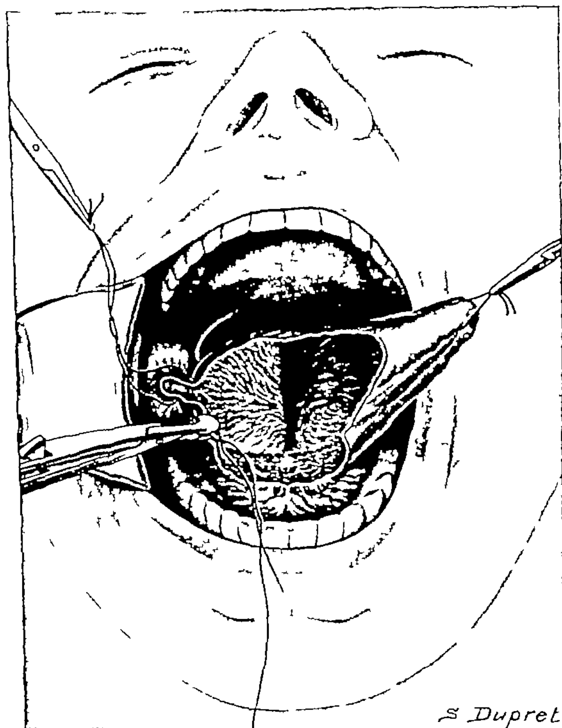


FIG 87.—CANCER OF THE TONGUE. AMPUTATION SECOND STAGE.
Repairing the opening in the tongue by catgut.

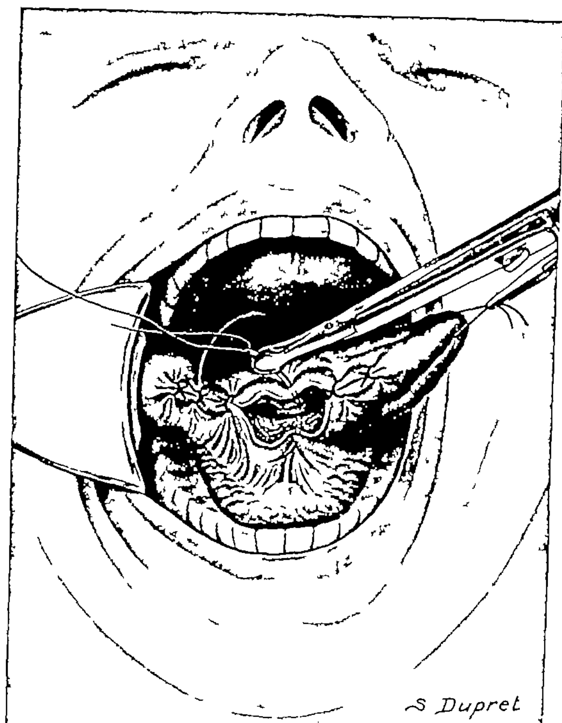


Fig 88.—Cancer of the Tongue. Amputation Second Stage.

Repairing the opening in the tongue. The sutures have at the same time produced hæmostasis. The present case required no ligatures. The sutures are of catgut.

V

TREATMENT OF GOITRES

GOITRES are *cervical* or *endo-thoracic*

CERVICAL GOITRE —This is the common form. Adenoma of the thyroid may be diffuse or nodular

Diffuse Goitre —The thyroid appears normal in form and outline, but is larger in size. The hypertrophy may affect one or two lobes According as the hyperplasia predominates in the glandular tissue, in the vessels or in the cellular tissue the goitre is said to be ' parenchymatous," " vascular," or ' fibrous.' The *nodular goitre* is the usual variety The adenomatous degeneration shows itself in the form of a circumscribed tumour, encysted and encapsulated, and can easily be enucleated, the tumour may be single or multiple. In this latter form the nodules may be conglomerated into one mass enucleable or otherwise or imbedded in a nearly normal paren chyma each of which can be enucleated separately

Nodular goitres are similar in the great majority of cases and can be satisfactorily treated surgically

What is the Prognosis of a Cervical Goitre, if left to Itself ?— Although some patients reach old age with a goitre this disease is an important defect, which has no right to be treated by default, all the more so as its treatment is simple and effectual.

Is it Necessary to Treat Cervical Goitres Systematically ?— Certainly yes all goitres ought to be treated We are astonished a doctor operates on a hernia when he treats a goitre negligently Moreover the treatment of this affection is quite clear radium therapy radio-therapy iodine or surgical treatment, have their clear indications each is mild and effectual

Then, why not attack systematically an affection which threatens the life of the patient shortens his existence, and diminishes his vital powers ? Why have some colleagues still the preconceived notion the operation is dangerous and jeopardises the intelligence and life of the patient ?

All goitres should be treated, even cervical ones, because they shorten life by means of the following processes

(*a*) Cancerous change (nine thyroidal cancers out of ten are engrafted on goitres) (*b*) Asphyxia from compression. (*c*) Hypothyroidism (myxœdema) (*d*) Hyperthyroidism and toxic symptoms which may frequently end in Basedow's disease, or in degeneration of the myocardium, myocarditis is not only frequent but is nearly always the rule, it can to all intents and purposes be said, all goitrous subjects are sufferers from myocarditis *in posse* If, exceptionally, some patients attain old age, without much illness, this is only due to an antitoxic power they individually possess, but from the outset every goitre—even if it does not produce cancer or symptoms of suffocation—shortens life and diminishes the vital and social life of an individual from its evil effect on the circulatory system.

INTRATHORACIC GOITRE —In every case these goitres should receive surgical attention they are either "diver" or "aberrant," according to whether they come from a cervical goitre or develop in the anterior mediastinum, from an aberrant thyroid The "diver" goitres are the prolongation of a thyroid lobe. The adenomatous degeneration can be localised in the wandering part or extend to both the cervical and the mediastinal portion, the mass then presents the form of a bag, the neck corresponding to the clavicle and the two other parts, always unequal in size, to the thoracic cavity

"Diver" goitres can be intermittent (40 per cent) or permanent.

The intermittent wandering or retro-sternal ones descend some centimetres only behind the sternal notch, but can be easily palpated in the neck *in toto*, during the movements of deglutition, often they wander from and reappear in the neck, almost at will, following the movements of the larynx and the trachea

The upper part of a permanent diver" goitre can only be palpated in the neck its lower prolongation is permanently fixed in the thorax and never leaves it

Intermittent ' diver goitre runs the risk of being wedged in and producing fatal asphyxiation

MEDICAL TREATMENT OF GOITRE —This is suitable for the diffuse and fleshy forms in young subjects as also in women with thyroid congestion at puberty in pregnancy after delivery, and at the menopause It fails in cases of nodular goitre which must be

Medical treatment consists in thyroidal opotherapy, by means of the fresh or dried gland, and of iodothyrine (above all, if the lesion be accompanied by thyroidal insufficiency as shown by megrims, rheumatoid pains, apathy and cutaneous dystrophies) Opotherapy, in order to be efficacious, ought to be carried out patiently and slowly It is not harmless, and watch must be kept over its employment, for it sometimes produces circulatory excitement and symptoms of Basedow's disease (Léon Bérard) *

Radio- and radium therapy, which have given in primary exophthalmic goitre good and rapid results, are less efficacious in simple goitre, above all, if it has developed for more than a few months Moreover, goitres submitted to irradiation instead of operation, are surrounded by adhesions which make extirpation difficult The adhesions unite the tumour by its capsule to the vessels and to the neighbouring organs (Léon Bérard)

SURGICAL TREATMENT OF GOITRE —Operation may be performed at "leisure"—that is, to get rid of the unsightly troublesome masses, "suddenly" for such complications as inflammations, compression and secretory troubles, causing dysphagia, dyspnœa and tachycardia The mean of the cases operated upon is from twenty to fifty years Of 1 000 cases of goitre on which he has operated Léon Bérard (of Lyons) has seen no death

We have operated on about 300 cases (an enormous number, considering where we have practised) One patient died of apoplexy the evening of the operation—a very old woman, we do not think the operation had any connection with the cerebral hæmorrhage. All the others were cured, the majority without any trouble, certain operative difficulties were present in some of them

In some diver goitres we have during the operation, witnessed slightly startling occurrences which had no serious consequences, the ultimate results were perfect. Twice the trachea was soft, and we had to suspend it on each side by a few catgut stitches fixing it to the sterno-mastoid. Three times the patients nearly died on the table for we did not then know of Judd's procedure once we performed tracheotomy

SURGICAL ANATOMY OF GOITRE—*Mobility* —The goitre is movable in the neck with the trachea and its vessels—*e g*, in vertical movements during deglutition both are displaced with the goitre When the goitre is moved transversely the trachea moves at the same

* Traitement du Goitre" by Léon Bérard (*L Avenir Médical* June, 1921)

All goitres should be treated, even cervical ones, because they shorten life by means of the following processes

(*a*) Cancerous change (nine thyroidal cancers out of ten are engrafted on goitres) (*b*) Asphyxia from compression. (*c*) Hypothyroidism (myxœdema) (*d*) Hyperthyroidism and toxic symptoms which may frequently end in Basedow's disease, or in degeneration of the myocardium, myocarditis is not only frequent, but is nearly always the rule, it can to all intents and purposes be said, all goitrous subjects are sufferers from myocarditis *in posse* If, exceptionally, some patients attain old age, without much illness this is only due to an antitoxic power they individually possess but from the outset every goitre—even if it does not produce cancer or symptoms of suffocation—shortens life and diminishes the vital and social life of an individual from its evil effect on the circulatory system.

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time. This is a means of diagnosis During operation, when, after incising the subhyoid muscular plane, the adenomatous lobe is exteriorised the thyroid body, trachea, arteries, and veins are raised at the same time This close connection of the organs depends in the first place on the fact that the posterior surface of the thyroid is closely adherent to the anterior surface of the first vessels of the trachea (Sébileau), and on the other, that the superior and inferior thyroids arising far from the gland and coming to it by a long path, easily lend themselves to the stretching produced by exteriorisation (Sébileau)

The Cellulo-vascular Sheath —The thyroid gland is surrounded by a special capsule of connective tissue which is thin and adherent to the thyroid gland, in its centre the veins visible on the anterior surface of the lobes meet Independent of this sheath proper, the gland is surrounded by a second connective tissue layer conveyed to it by the arterio-venous stalks from the sheath of the large nervous and vascular mass in the neck This connective tissue layer after having acted as the tunica media of these vessels, surrounds the thyroid the œsophagus and the trachea, constituting a true visceral covering (Sébileau) There is then round the thyroid particularly at the point where the vascular pedicles enter—*i e*, at the two poles and on the upper border—a vascular space, which by adhesion of its two layers with the capsule proper disappears over the thyroid gland itself at the same time as the vessels expand under its capsule proper and on its surface. It is in this sheath, vascular portal'* (Sébileau), the thyroids make their way to the thyroid gland In this space the recurrent nerve ascends from the trachea to the inferior border of the inferior constrictor Consequently, in order to reach a diffuse goitre it is not necessary to divide the vascular layer and the tissue for the purpose of gaining access to and liberating the vessels and the nerve Separation of the capsule of the thyroid from the gland itself should be made under the deep surface of this sheath there is then no risk of lacerating the vascular ramifications and the nerve but these anatomical considerations are of no account when applied to a nodular goitre and also to some parenchymatous or diffuse goitres which often alter the condition of the capsule. At the periphery of the tumour the conjunctival layers become thick and superimposed forming a capsule of many layers this capsule is central when the adenoma is central—*i e* intra glandular,

* Ma technique de l'extirpation des Goitres," by Sébileau (*Paris Médical* January 8 and 15 1921)

it is superficial when the adenoma is superficial, and its development has brought it to the surface of the thyroid Hence, two operative considerations arise (Sébileau)

1 There are few goitres which cannot be enucleated from their capsule—i e , decorticated

2 During enucleation the surgeon runs the risk of meeting many layers The nearest one—viz., that separating the capsule proper of the tumour from the first layer of tissue which surrounds it—is the only one which is distinct.

Diffuse goitres have the same capsule as that of the thyroid, a peripheral extra-glandular decortication is, therefore, necessary

Nodular goitres (nine out of ten) have a distinct capsule in the centre of the parenchyma An extra glandular cortical decortication is obligatory But as a central goitre, whilst increasing in size, gradually absorbs the gland often reaches the surface and becomes extra thyroidal decortication then becomes a mixed one, it is both central and peripheral central for the portion of the tumour which remains within and peripheral for the part which has come to the surface There are some goitres in which the capsule is badly differentiated or is incomplete. In the middle of the thyroid which is studded with nodules some can be enucleated easily, others can only be separated by dissection.

Vascular Pedicle —The inferior has no vein and penetrates into the middle of the thyroid gland, the artery divides before reaching the gland, and the recurrent nerve inserts itself between its branches The superior pedicle contains artery and vein, and reaches the superior cornu, there the artery and vein separate

Must the Thyroid Arteries be Tied ?—Personally we tie the inferior thyroid every time it is easily visible and can be felt This makes the operation field cleaner and more bloodless it is not absolutely necessary as Sébileau leaves it alone with success do not, also endeavour to tie it in the simple mononodular, small goitre, or when it is hardly perceptible We look for the artery, but do not insist on tying it if it be well hidden.

Four times out of five we tie the inferior thyroid, once out of six we tie both on the same side

Need we Trouble about the Recurrent Nerve ?—Personally, we always look for it when ligaturing the thyroid, and we ask the patient to speak to be sure we have not tied it The risk of injury, moreover to the nerve is slight Sébileau says there is the less necessity to trouble about it as even in the cases where on the

posterior surface of the thyroid the capsule is thinner, there is always connective tissue in the deep surface, outside of which the nerve remains Owing to the removal of the goitre, the recurrent nerve, even in exceptional cases, remains free from danger, extraction brings with the thyroid the vessels which enter it, the nerve is attached to the larynx, and remains immovable in the region of the trachea, indifferent to any procedure, and protected by its distance (Sébileau)

Need we Trouble about the Parathyroids ?—They occupy the inferior third of the lobes in the tracheo-œsophageal angle, or at the summit of the inferior pole, they are most often situated behind the capsule and the vascular sheath of the organ, consequently they run hardly any danger They must certainly be avoided, since their atrophy produces tetany, but directly the recurrent is evaded, they of necessity escape, as they lie in the vicinity

We will study successively the surgical treatment of cervical and intrathoracic goitres ("diver and aberrant)

CERVICAL GOITRE—ANÆSTHESIA —For twelve years we operated under general anæsthesia, for ten years we have found local anæsthesia more convenient, it does not produce shock causes no respiratory trouble during operation, or hindrance to the operator from attacks of coughing or possible vomiting

POSITION OF THE PATIENT —The patient lies on his back, with head markedly extended The mouth and the nose are covered so as not to contaminate the field of operation A linen cap surrounds the patient s head.

INCISION —Transverse incision 1 or 2 centimetres from the sternum, *en cravate*, following a fold in the neck. In this way the cicatrix is not visible This incision gives sufficient room if it be long enough In some voluminous goitres it is better to make a horseshoe incision, the concavity uppermost If the tumour be large, excise a lozenge-shaped piece of skin.

DIVISION OF THE PLATYSMA AND SUBCUTANEOUS VEINS —Bleeding is arrested as required with catgut 000 to avoid the inconvenience of forceps if a vein be forgotten, it can produce a post-operative hæmatoma For this second reason it is better to tie the veins separately

OPENING THE SHEATH OF THE STERNO MASTOID —This muscle is usually stretched and narrowed Open the sheath and liberate its deep surface Place a retractor on its anterior border The

subhyoid muscular layer which covers the goitre is thus exposed, this layer consists of the atrophied, laminated, discoloured prehyoid muscles, un united and intermingled into one level. Cut it with the knife from one extremity of the wound to the other

EXTERIORISATION OF A THYROID LOBE —The operator should pass his two index fingers behind the hypertrophied or adenomatous thyroid lobe. Often it is necessary to free the lower extremity towards the mediastinum. Luxation is sometimes troublesome, but this stage is always possible and quick. It is what Sébileau calls "accouchement" of the goitre. The adenomatous lobe is to be brought outside and drawn by the left hand to the opposite side, whilst a retractor, placed on the sterno-mastoid, uncovers the region of the vessels, the floor of which is formed by the trachea, œsophagus and spine The index finger of the right hand should feel for the pulsation of the inferior thyroid, if felt, tie the artery, if not leave it and attack the anterior surface of the capsule.

ENUCLEATION —The inferior thyroid is tied Divide in front the capsule of the thyroid tissue concealing the tumour, then with the point of closed scissors strip up the line of the incision, keeping close to the tumour and not losing contact with the nodule Enucleation has begun. Continue by separating the nodule with a gauze tampon on forceps Enucleate by brushing, stripping the nodule of its thyroidal capsule without troubling about the vessels in the peri phery If the thyroid be not tied, the capsule will bleed, but this will partly stop of its own accord. The older the goitre, the easier is enucleation because it is provided with a thick and dense capsule, which lends itself better to decortication.

HÆMOSTASIS —This is very important both as regards the super ficial as well as the deep vessels I repeat it is better to tie the inferior thyroid, which is generally quite palpable, if it be thought the goitre will bleed direct hæmostasis is then almost nil. The ligature is made as follows directly the thyroid lobe is exteriorised apply a retractor to the sterno-mastoid, and bring the tumour over to the other side and deep down the trachea œsophagus and spinal column are visible Look for the recurrent nerve, and feel for the pulsation of the inferior thyroid. If the artery be not easily found because it is small do not persist, if found easily and be large use Deschamp s needle tie the artery with catgut, and place a compress soaked in saline in the bed of the carotid, and commence enucleation.

Hæmostasis of the Thyroid Capsule —The nodule is enucleated, the bottom of the thyroid cavity may or may not bleed seize the

edges of the capsule with forceps, and suture *en masse* to fill up the cavity of the adenoma, this suture, which takes in the bottom of the cavity, stops the bleeding Sébileau does not apply the primary ligature, but is content to stop the bleeding by "suture" at the end of the operation Personally, we think there is no rule, the essential *thing is to succeed with the method we know* When the operation is finished, without stopping the bleeding of each artery furnish the floor of the wound, pare the ragged edge of the thyroid, and then close the capsule by means of a catgut purse-string suture, *replace the sutured thyroid* at the side insert a bundle of thread for drainage

Suture the skin with a continuous suture of catgut 000

Should Drainage be Employed ?—Again there is no absolute rule Formerly, following the example of our Swiss colleagues, we drained, now we do not drain the small *thyroidal masses* which are hermetically sutured, but the large ones, close to which extensive distinct spaces exist. We use a bundle of silkworm gut as a drain, left in contact with the sutured thyroid, passing out of a counter opening below the line of suture This capillary drainage causes no inconvenience and has no resemblance to drainage by a tube It is removed in twenty four hours In some cases there is no bleeding in others the dressing is soaked with lymph and blood

Differences in Technique according to the Anatomical Conditions —The preceding operation applies to mononodular goitres—*i e.* those consisting of a single degenerated mass within a lobe of the thyroid and which has or has not become subcapsular

Polynodular *goitres ought to be treated as the mononodular*, the operator treats each nodule as in the mononodular form Directly the adenoma is enucleated he repairs the wound as just indicated by deep closure of the wound and a superficial suture *It is a succession of enucleations* (Sébileau)

Massive Polynodular Goitres —The adenoma is multiple, and all the nodules are joined together These goitres form as a whole, a kind of agglomerate pluriglandular mass which is itself encapsulated in the glandular parenchyma, and can be separated by decortication this mass, which in front projects from the thyroidal parenchyma and becomes subcapsular, is *only* slightly attached posteriorly *to the surface of the gland* This *form is to be treated* by massive enucleation—*i e* the operator leaving the nodules united to each other, enucleates the whole *en masse* sparing the cortical part of the thyroid especially near its posterior part In other

words, the operator treats the polynodular mass *en bloc*, as he does a mononodular goitre. In cases of this kind the primary ligature is of great service, for hæmorrhage is apt to hide the field of operation Directly the degenerated part is enucleated, the thyroid capsule shows a thick posterior wall formed by the normal glandular tissue, which cuts off the recurrent nerve and the parathyroids When enucleation is completed the operator treats the thyroidal raw edges as in the case of poly or mono glandular goitres

Diffuse Goitres —The operator may have to do with a diffuse or with vascular goitres in which the gland has kept its form and normal consistence We have operated twice on very vascular goitres pulsating and 'swelling", owing to the primary ligature of the two thyroids operation was easy We have left each time a piece of the gland in contact with the thyroidal capsule near the recurrens and the trachea Cure resulted without incident. The operation consists in a subcapsular subtotal thyroidectomy, we proceed as follows the inferior thyroid artery is tied, then the superior above the cornua of the thyroid, or the cluster of vessels on the cornu of the thyroid is ligatured leaving thus in the superior thyroid filament a glandular piece the size of a nut

The gland is then attacked by the subcapsular route we separate it by a compress, and when near the trachea we substitute the knife for the compress, and cut into the gland in order to leave a layer of thyroidal tissue in contact with the deeply situated organs—trachea œsophagus, recurrent nerve, parathyroids, the isthmus is tied close to the trachea, the fragments left of the thyroid are small or large according to whether we have to attack the other lobe If the hypertrophy be bilateral, we leave a larger piece of tissue if the lesion be bilateral, but unequally so, we attack only one or two lobes and extirpate it nearly completely, prepared to operate again some months later if necessary

INTRATHORACIC WANDERING GOITRE.—The adenomatous mass arises from the cervical goitre and increases at the expense of the lower portion of a lobe it generally descends gradually from cough ing swallowing or as a result of special mobility of the organ (thyroptosis) For some time the descent is intermittent, but under the influence of adhesions with the neighbouring tissue the intra thoracic tumour remains permanently in the mediastinum, where it continues to increase in size.

Intrathoracic goitre shows intimate connections with the upper structures in the thorax carotids veins recurrent nerve, pneumo-

gastric, base of the heart, trachea, œsophagus, these connections can cause anxiety to an operator not prepared for them, but he can be reassured by knowledge of the three following facts

(*a*) The tumour is always surrounded by a conjunctival capsule, which cuts off a detachable space and permits enucleation of the mass without fear of injuring the neighbouring organs

(*b*) The vessels which supply this adenomatous mass are all cervical, the tumour receives none from the thorax. The inferior thyroid enters the middle part of the thyroid in the middle of the neck, and is sufficient with the superior to nourish it The whole vascular supply comes, then, from this side, the operator will not require to stop bleeding in the thorax

(*c*) During operation instead of attacking the tumour directly with the finger, which will squeeze the mass between the trachea and the bone, it is better (Judd) to liberate first the cervical part of the thyroid, and to pull on it in order to bring it up from the mediastinum Suffocation is then avoided

The complications of endo-thoracic goitre may be those of cervical goitre, toxic phenomena with cardiac symptoms, or those of Basedow's disease *But it is rare for this goitre to produce the* latter condition probably because the respiratory symptoms compel an earlier operation.

Compression of the trachea is serious Slowly and progressively, flattening occurs from before backwards or transversely, the trachea is displaced, its rings atrophied and its tube becomes like a riband, its lumen reduced to a slit In two cases we *feared unpleasant com*plications from nothing except this dystrophy

In cases of cancer the tumour contracts intimate adhesions with the nerves and large vessels of the region, the surgeon should dread this neoplastic transformation, owing to the sudden development of symptoms, and if he seriously fear a malignant growth it is preferable to abstain from operation.

The diagnosis of endo-thoracic goitre is made as follows

Appearance of the Patient —The neck is generally enlarged low down, or the cervical part of the goitre disappears behind the sternal notch The upper extremity of the wandering lobe *is often per*ceptible by the fingers The skin is covered by a network of dilated veins All the functional symptoms due to the cervical goitre are exaggerated *goitrous voice* the breathing is more difficult, sometimes attacks of suffocation, false asthma dyspnœa on exertion, etc

The laryngoscopic examination (necessary) shows paresis of a

vocal cord Radiographic examination (indispensablé) shows a shadow

Every goitre, even apparently purely cervical, ought to be examined by the X rays and the laryngoscope used Although these examinations are very often negative, the sole fact that they may sometimes be positive is an indication for their employment It is, in fact, absolutely necessary to diagnose thoracic goitres before operating, 5 per cent of goitres are endo-thoracic goitres.

Regional Anæsthesia.—This includes paravertebral anæsthesia, with two subcutaneous injections, supra-clavicular and supra-hyoidal.*

Operative Technique —The first stages are the same as for cervical goitre.

1 Transverse incision in a cutaneous fold of the neck.

2 Division of the platysma and of the superficial veins Complete hæmostasis immediately

3 Liberation of the anterior border and of the deep surface of the sterno-mastoid on the side of the operation. Farabœuf's retractor is to be placed on this border

4. Division of the sub-hyoid muscles. This division is not absolutely necessary in cervical goitres, in ordinary cases division in the middle line is sufficient, but for every intrathoracic goitre it is necessary to divide the muscular layer of the subhyoids, not only on the side of the operation but on both sides The division is to be made the whole extent of the wound as far as the thyroidal mass.

The technique is now quite different for the cervical goitre and for the endo-thoracic form.

How to Enucleate the Cervical Part—What should not be Done.—Do not introduce the finger into the thorax, nor attack the mass directly in order to enucleate it. I have succeeded, certainly, on many occasions by this procedure, but each time some tense seconds or minutes have been passed, and affairs might have turned out badly Why? Because the trachea is compressed and narrowed, sometimes it is soft, and symptoms of asphyxia might be very marked

How to Avoid the Dramatic Stage, even Death on the Table—Employ Judd's method—*i e* do not attack the intrathoracic tumour directly but first free completely the upper half, after

* Anesthésie régionale " Victor Pauchet, Paul Sourdat, and Gaston Labat (Editor Doin, Paris, 1920 3rd edition.)

division of the superior thyroidal vessels, make use afterwards of this part *of the thyroid as a tractor*, and by means of it drag, little by little, the endo-thoracic mass into the neck The procedure is as follows

(*a*) Divide the subhyoid *muscles*

(*b*) Place a retractor on the upper lip of the wound, and look for the superior thyroid vessels

(*c*) Tie and cut them between *two ligatures*

(*d*) Catch hold of the thyroid lobe, separate it from the larynx and from the trachea by the compress, slowly without bleeding, there is no suffocation, owing to the local *anæsthesia*, and to the fact that the thoracic tumour has not been touched.

(*e*) Removal of the thoracic prolongation. Pass the right index finger gently down to the thorax and follow the upper contour of the tumour A slight effort of this finger on the thyroidal mass is often sufficient to assist the traction exercised by the left hand The mass being encapsulated, surrounded by a free space, separation from the surrounding *tissues* is *easy* If, however, there be any difficulty, and if some adhesions exist, intraglandular enucleation is necessary, incise with the knife the thyroidal capsule exposed *in the neck*, *the index finger finds thus above the clavicle and in* the glandular mass a line of separation, gradually insert a tampon on forceps and by brushing enter nto the place of enucleation. Whilst drawing on the cervical mass with the left hand enucleate and pull back with the right the mediastinal mass which follows the cervical part. Intraglandular enucleation in this way is generally unnecessary, most often the thyroidal mass is enucleated *en bloc* without difficulty, and without asphyxia owing to the use of both hands Then turn back the tumour *only held by the inferior artery* (if that has not been divided) towards the trachea the isthmus forms a pedicle and is easily cut

If the operator desire to keep a part of the thyroid tissue he performs intraglandular enucleation on the exteriorised mass as in an ordinary cervical goitre, if on the contrary he find the whole thyroid degenerated and thin he sacrifices completely that half of the organ he does this without scruple if the opposite side be healthy, and if he can *retain sufficient normal tissue to prevent* any sign of myxœdema The remainder of the operation requires no *particular description* a bundle of thread passed down deeply acts as a drain for twenty four hours

PROGNOSIS —The mortality from goitres with intrathoracic prolongations is almost nil by this procedure Without doubt a delayed operation due to the prejudices still existing in the minds of many doctors, is always to be feared, and is harmful to the patient. Certain goitres show toxic symptoms whether they be mediastinal or cervical. These complications most often cardiac, may occur within forty-eight hours of the operation, and show themselves by acute dilatation of the heart and rapid death They are very rare. In every case, the best way of obviating them is to operate on goitres before they have reached this late stage

INTRATHORACIC ABERRANT GOITRE —Here there is no anatomical relation between the cervical and the thoracic adenoma, but there can exist at the same time a cervical and thoracic goitre. We have operated in one case without having noticed the presence of a mediastinal tumour

The diagnosis is made by the mediastinal symptoms without cervical signs The clinical characters and complications are, however, the same as those of intrathoracic goitre (*a*) symptoms connected with the voice (*b*) respiratory symptoms suffocative attacks, false asthma, dyspnœa, etc., (*c*) condition of the skin, dilated network of veins, in advanced cases cyanosis palpate the retro-sternal region with the bent index finger in order to detect a retro-sternal prominence find out the fixity and relative immobility of the trachea and larynx, percuss the retro-sternal region in order to elicit slight dulness, laryngoscopic examination sometimes reveals paresis of a vocal cord radiographical examination shows a shadow above the large vessels

OPERATIVE TECHNIQUE.—Every suspected aberrant goitre requires operation. On this point no doctor or surgeon hesitates, but the difficulty is greater than with a cervico-thoracic goitre, especially if the goitre lie deeply, but once the diagnosis be made, the knowledge of the size of the tumour of its site and connections, allows the surgeon to make his plan of operation.

The technique is the same as for cervical and cervico-thoracic goitre the incision must be very low It should be transverse, it is perhaps wise to divide the lower extremity of the sterno-mastoid, we have no experience of the latter, having had only one case, not recognised at the time of the first operation. Aberrant goitre amounts to about 1 per cent of cases of goitre.

POST-OPERATIVE COMPLICATIONS —(A) *Thyroidal Symptoms* — After the operation thyroid insufficiency may occur (asthenia, apathy,

a feeling of cold, without any myxœdematous symptoms) To avoid these symptoms, the whole of the thyroid lobe should not be removed, always leave a portion of it in the wound—i e, a postero-external portion which contains the parathyroids Thus, about one-fourth or one-third of the primary gland should be preserved.

During the first two to five days after the operation thyroidal fever, 38° to 38 5°, is often noticed.

(B) *Recurrences*—These are rare On one occasion we have operated five times on the same patient, it is the only instance in our practice.

Generally they occur when, for fear of removing too much of the gland, some thyroid nodules have been left behind

It is safe to reoperate there is no danger

(C) *Respiratory Complications*—Tracheo-bronchitis sometimes occurs, especially when the trachea has been distorted by compression. Twice we have observed collapse of the trachea, the walls of which were softened and flattened like the blade of a sword. Asphyxia is obviated by fixing the walls to the sterno-thyroid muscles.

(D) *Lesion of the Nerves*—All patients operated upon suffer from dysphagia for three or four days, owing to dragging on the thyroidal nerves Pains do not occur if anacain be used. Troubles of phonation, from hoarseness to aphonia, due to dragging on the recurrent nerve at the time of excision of the thyroidal mass outside, likewise result. During the whole of the operation the surgeon should avoid pinching, tying or cutting the nerve. Regional anæsthesia is perfect for the reason it permits the patient to speak during the operation. On one or two occasions we have tied or squeezed the nerve. We noticed it immediately, the patients were hoarse for some days. The symptoms disappeared

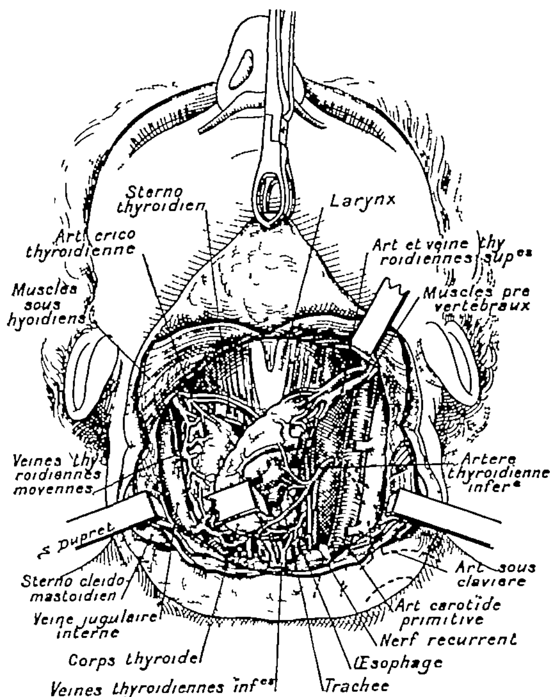


FIG 89 —TREATMENT OF GOITRES.

Anatomy of the neck Connections of the thyroid. Note the space as a result of the incision in the neck, and the site of the thyroid arteries, superior and inferior: the latter reaches the gland, not at its inferior pole, but at its posterior and middle surface In consequence, a thyroidectomy for intrathoracic tumour runs no risk of rupturing a nutrient vessel. The vessels come from the neck at a higher level.

Sterno-thyroidien = Sterno-thyroid. *Larynx* = Larynx. *Art. crico-thyroidienne* = Crico-thyroid artery *Art et veine thyroidiennes supes.* = Superior thyroid artery and vein *Muscles sous-hyoidiens* = Subhyoid muscles. *Muscles prévertébraux* = Prevertebral muscles. *Veines thyroidiennes moyennes* = Middle thyroid veins. *Artère thyroidienne infère.* = Inferior thyroid artery *Sterno-cleido-mastoidien* = Sterno-cleido-mastoid. *Art sous-clavière* = Subclavian artery *Veine jugulaire interne* = Internal jugular vein. *Art carotide primitive* = Common carotid artery *Corps thyroide* = Thyroid gland. *Nerf récurrent* = Recurrent nerve *Œsophage* = Œsophagus. *Veines thyroidiennes infes.* = Inferior thyroid veins. *Trachée* = Trachea

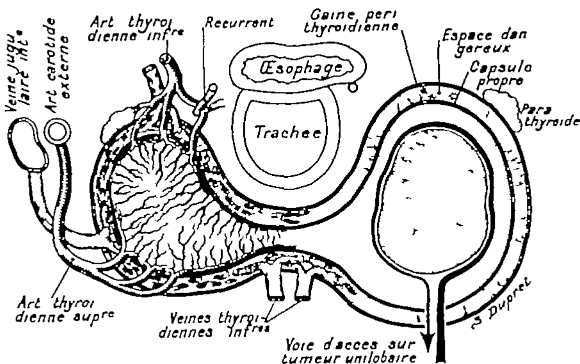


Fig 94 —Treatment of Goitres.

Section of the thyroid. On the left the nodular goitre; on the right the direction of the arrow shows the technique of intra-glandular enucleation. Note the site of the recurrent nerve and parathyroids, which obviously remain distant from the operative field when enucleation is performed

Veine jugulaire intᵉ.=Internal jugular vein. *Art carotide externe*=External carotid artery *Art thyroïdienne infre.*=Inferior thyroid artery *Récurrent*=Recurrent nerve *Gaine péri-thyroïdienne*=Peri thyroidal sheath. *Espace dangereux*=Dangerous space. *Capsule propre*=Capsule proper *Parathyroïde*=Parathyroid. *Œsophage*=Œsophagus *Trachée*=Trachea *Art thyroïdienne supre.*=Superior thyroid artery *Veines thyroïdiennes infres.*=Inferior thyroid veins. *Voie d'accès sur tumeur unilobaire*=Path of access to a unilobar tumour

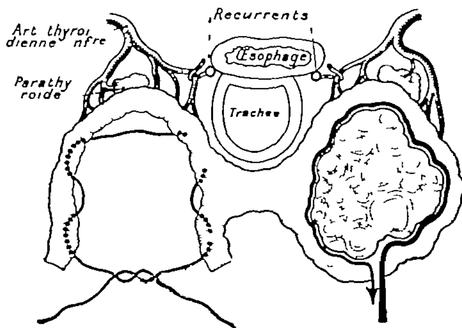


Fig 95 —Treatment of Goitres.

Large enucleation of a multinodular goitre All the nodules adhere to each other and the adenomatous mass is enucleated as if the adenoma were single. On the right the arrow points in the direction for intra glandular enucleation. On the left the method of performing obliteration after the operation The stitch of the suture avoids the bottom of the pocket to miss the recurrent nerve

Art thyroïdienne infre.=Inferior thyroid artery *Récurrents*=Recurrents. *Œsophage*=Œsophagus. *Parathyroïde*=Parathyroid. *Trachée*=Trachea.

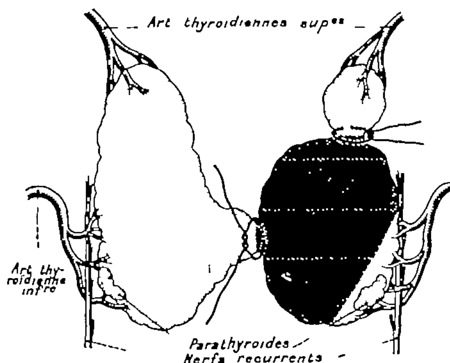


FIG 96—TREATMENT OF GOITRES.

Partial hemithyroidectomy for parenchymatous goitre. In this case the surgeon incises into the middle of the thyroid tissue A ligature ties the isthmus, another the upper part of the thyroid, preserving a small mass of it; this comparatively sparing resection is suitable for cases where the surgeon purposely sacrifices three-fourths or four fifths of the thyroid. In cases of bilateral thyroidectomy (exophthalmic goitre) the operator also preserves a small piece of thyroidal tissue in the postero-thyroidal region to isolate the parathyroids and the recurrent nerves. In cases of ex ophthalmic goitre, this operation can be performed on the two sides in two or three stages, the small mass of thyroidal tissue remaining in the stump of the upper thyroid being sufficient to assure function

Art. thyroidiennes supes.—Superior thyroid arteries. *Art thyroidienne infre.*—Inferior thyroid artery *Parathyroides*—Parathyroids. *Nerfs récurrents*—Recurrent nerves.

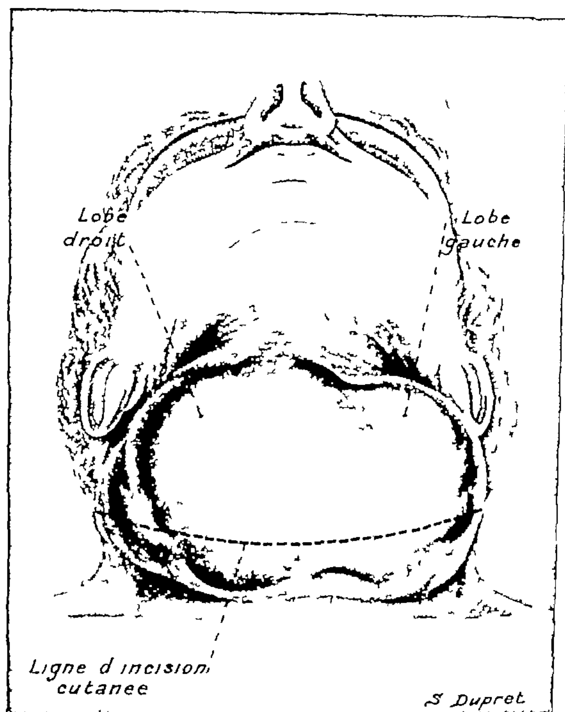


FIG 100.—TREATMENT OF MULTINODULAR BILATERAL GOITRE.

Incision en cravate

Lobe droit = Right lobe   *Lobe gauche* = Left lobe.   *Ligne d'incision cutanée* = Line of cutaneous incision.

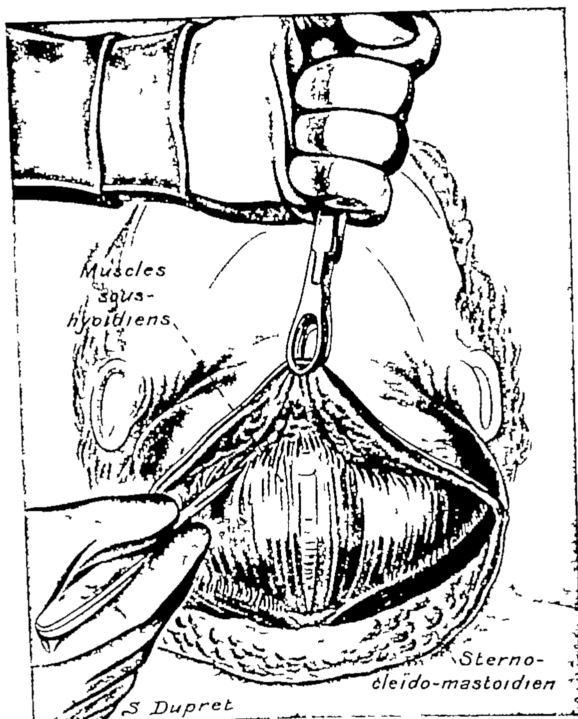


Fig 101 —Treatment of Bilateral Multinodular Goitre.

The knife divides the skin and the platysma. Tissue forceps hold up the middle of the upper lip of the wound The knife uncovers the whole of the sub hyoidmuscles and frees two flaps an upper and a lower

Muscles sous-hyoïdiens = Subhyoid muscles. *Sterno-cléïdo-mastoïdien* = Sterno-cleido-mastoid

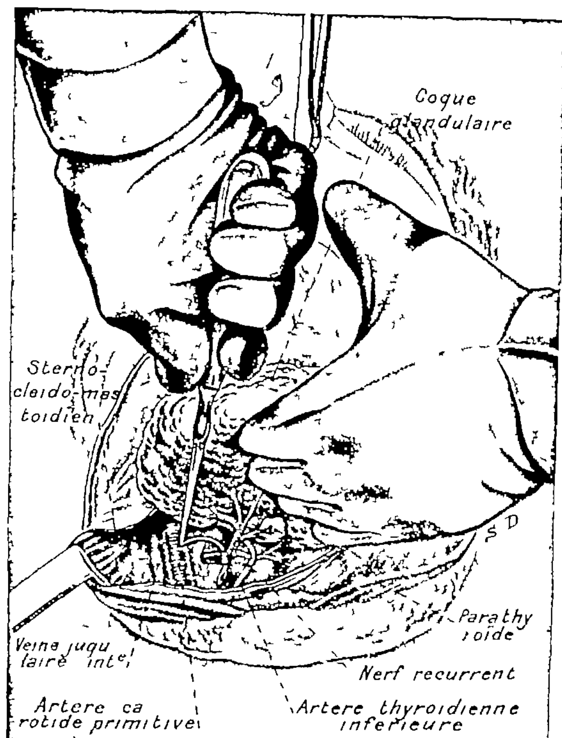


FIG 100.—TREATMENT OF BILATERAL MULTINODULAR GOITRE.

Ligature of the inferior thyroid artery Note the position of the recurrent nerve and of the parathyroids. The whole of the lobe has been displaced in order to see the inferior thyroid artery

Coque glandulaire = Glandular capsule *Sterno-cléido-mastoïdien* = Sterno-cleido-mastoid. *Parathyroïde* = Parathyroid *Veine jugulaire inte* = Internal jugular vein *Nerf récurrent* = Recurrent nerve *Artère carotide primitive* = Common carotid artery *Artère thyroïdienne inférieure* = Inferior thyroid artery

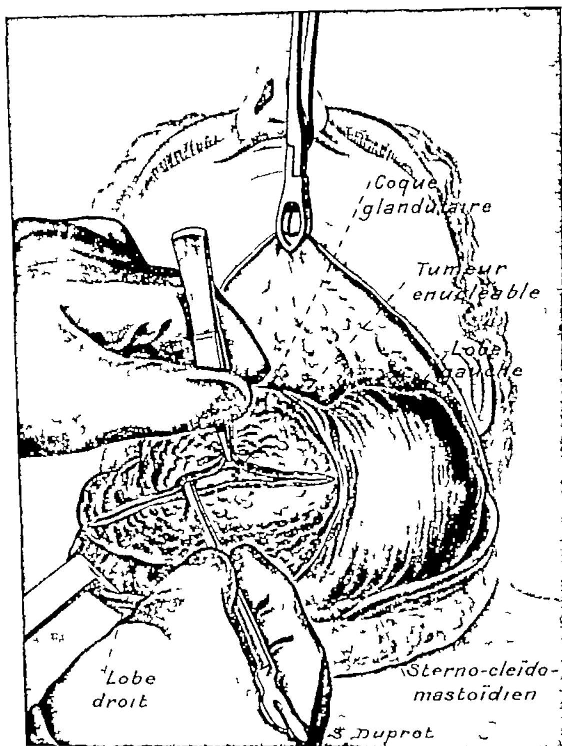


FIG 107 —TREATMENT OF BILATERAL MULTINODULAR GOITRE.

Division of the glandular capsule Intra glandular enucleation begun with a grooved director this is bloodless, owing to the primary ligature The ligature is not indispensable but it gives a more bloodless field for the operation, particularly in cases analogous to the one which serves as a model for this plate

Coque glandulaire = Glandular capsule. *Tumeur énucléable* = Enucleable tumour *Lobe gauche* = Left lobe *Lobe droit* = Right lobe. *Sterno-cléido-mastoïdien* = Sterno-cleido-mastoid.

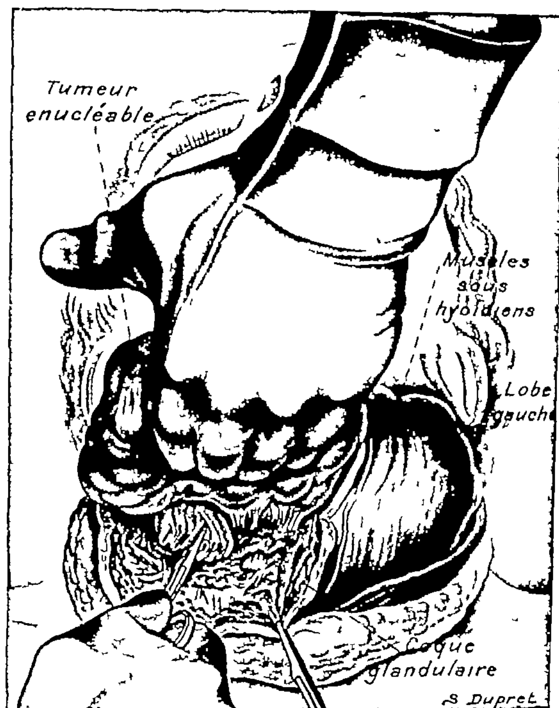


FIG 103.—TREATMENT OF BILATERAL MULTINODULAR GOITRE.

Large enucleation of a polynodular mass. Note the rôle of the intra glandular compress mounted upon forceps, the instrument of choice for this enucleation

Tumeur énucléable=Enucleable tumour *Muscles sous-hyoïdiens*=Subhyoid muscles.
Lobe gauche=Left lobe. *Coque glandulaire*=Glandular capsule.

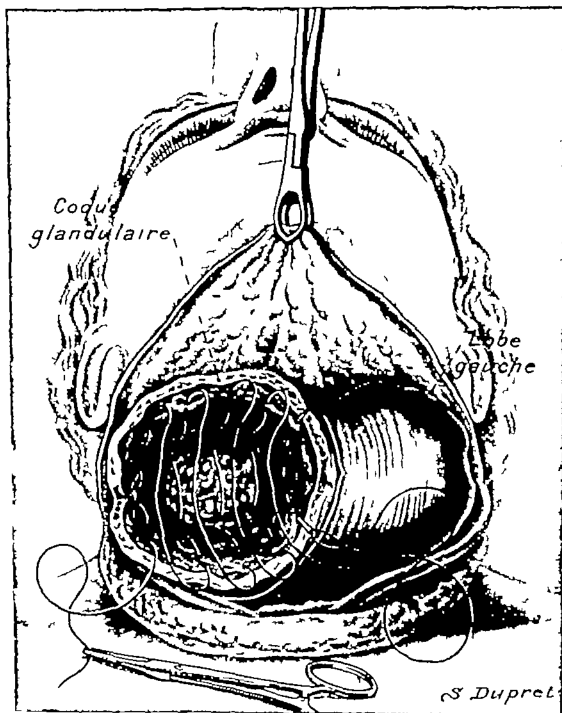


FIG 100 —OBLITERATION OF THE POCKET

It is absolutely necessary when the thyroid has not been ligatured but not so otherwise. The stitches do not pass through the bottom of the cavity for fear of the recurrent

Coque glandulaire=Glandular capsule. *Lobe gauche*=Left lobe.

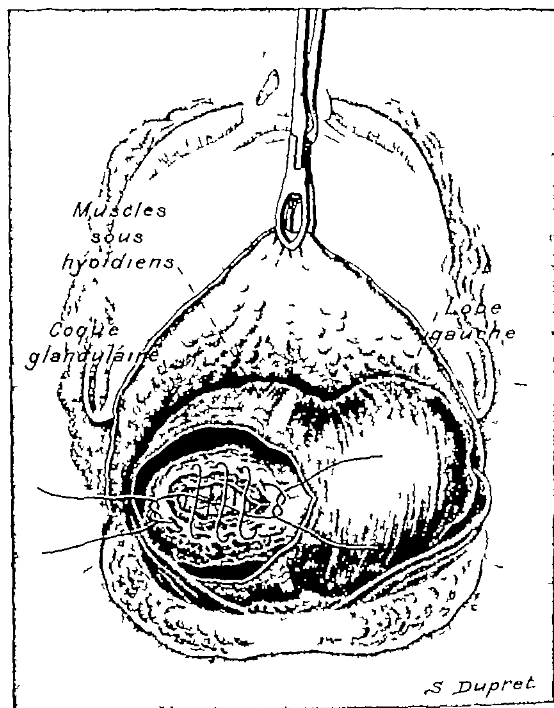


FIG 110 —TREATMENT OF BILATERAL MULTINODULAR GOITRE

Closure of the glandular capsule.

Muscles sous-hyoïdiens = Subhyoid muscles. *Coque glandulaire* = Glandular capsule *Lobe gauche* = Left lobe.

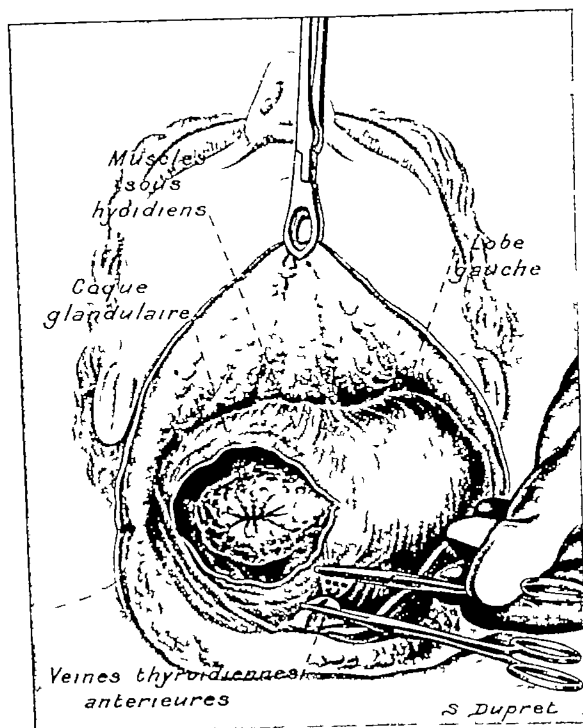


FIG 111 —TREATMENT OF BILATERAL MULTINODULAR GOITRE.

Appearance of the wound after closure of the glandular capsule. Ligature of the anterior thyroid veins.

Muscles sous-hyoidiens = Subhyoid muscles. *Coque glandulaire* = Glandular capsule. *Lobe gauche* = Left lobe. *Veines thyroidiennes antérieures* = Anterior thyroid veins.

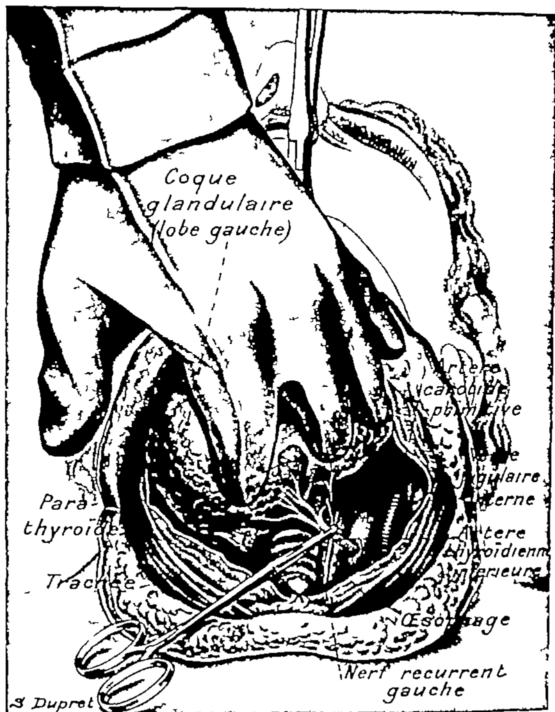


FIG 112.—TREATMENT OF BILATERAL MULTINODULAR GOITRE.

Intra glandular thyroidectomy with large enucleation on the left side Ligature of the inferior thyroid

Coque glandulaire (lobe gauche)—Glandular capsule (left lobe). *Artère carotide primitive*—Common carotid artery. *Veine jugulaire interne*—Internal jugular vein. *Parathyroïde*—Parathyroid. *Artère thyroïdienne inférieure*—Inferior thyroid artery. *Trachée*—Trachea. *Œsophage*—Œsophagus. *Nerf récurrent gauche*—Left recurrent nerve.

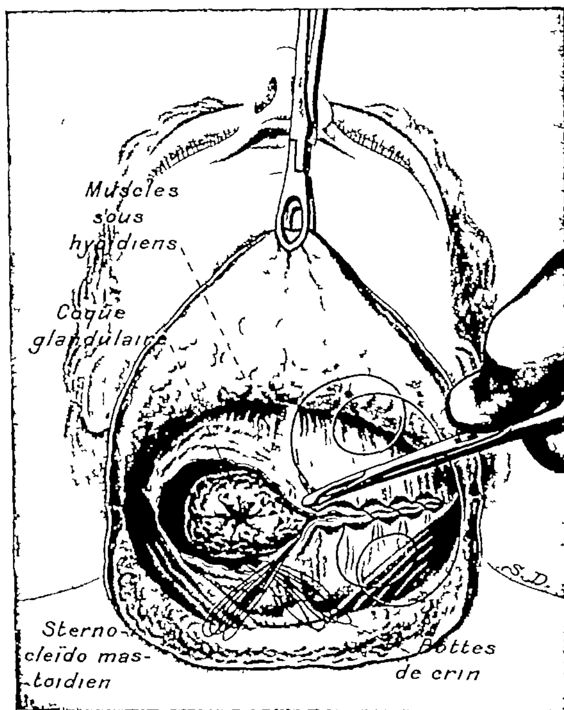


FIG 113.—TREATMENT OF BILATERAL MULTINODULAR GOITRE

Operation on the two thyroid lobes is finished Drainage with rubber tubing is injurious. Drainage with silkworm gut presents all the advantages of drainage and no inconvenience

Muscles sous-hyoïdiens = Subhyoid muscles. *Coque glandulaire* = Glandular capsule. *Sterno-cléido-mastoïdien* = Sterno-cleido-mastoid. *Bottes de crin* = Bundles of silkworm gut.

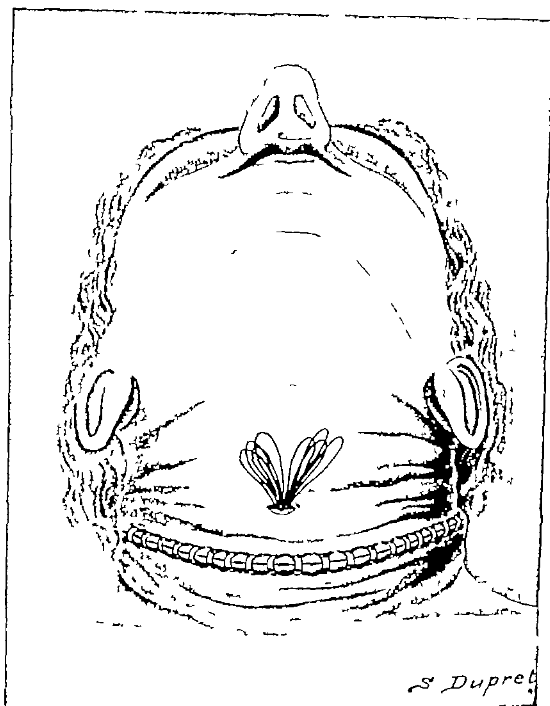


FIG 114.—TREATMENT OF BILATERAL MULTINODULAR GOITRE.

The drains are withdrawn at the end of forty-eight hours from a counter-opening and not from the wound. Here the lips are apposed by Michel's clips. One or two are taken away at the end of forty-eight hours. The suture which leaves the least trace is an interrupted one of linen thread, slightly tightened or a continuous one of cat gut 000.



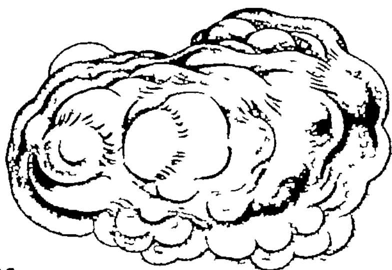


FIG 115.—TREATMENT OF BILATERAL MULTINODULAR GOITRE.

The two polycystic masses from the preceding operation Large intra glandular enucleation of a multinodular goitre

Lobe droit=Right lobe. *Lobe gauche*=Left lobe.



Fig 116.—Treatment of Exophthalmic Goitre.

Unilateral ligature of the thyroid arteries. The ideal treatment of exophthalmic goitre is large resection of the thyroid This resection ought to include two-thirds or even four fifths of the gland. In most cases this operation cannot be performed in one stage. The surgeon ought to perform a series of successive operations under local anesthesia the severity of which depends upon the patient s state. The extent of the interven tion *is based on the medical study of the patient the researches of the laboratory the* examination of the blood, of the secretions, etc The most simple operation consists in ligature of the two thyroids on one or both sides It should be completed by thyroidectomy in the way shown in Fig 06

Bord antérieur sterno-cléido-mastoïdien = Anterior border of the sterno-cleido-mastoid *Ligne d'incision* = Line of incision.



FIG 117.—TREATMENT OF EXOPHTHALMIC GOITRE.

Division of the muscles The sterno-mastoid is pulled to the right the subhyoids are divided to luxate the thyroid lobe however the operator can proceed along the white cervical line between the muscles as if he were endeavouring to reach an ovarian cyst after median laparotomy

Muscles sous-hyoïdiens=Subhyoid muscles. *Sterno-cléïdo-mastoïdien*=Sterno-cleido-mastoid *Ligne d'incision*=Line of incision.

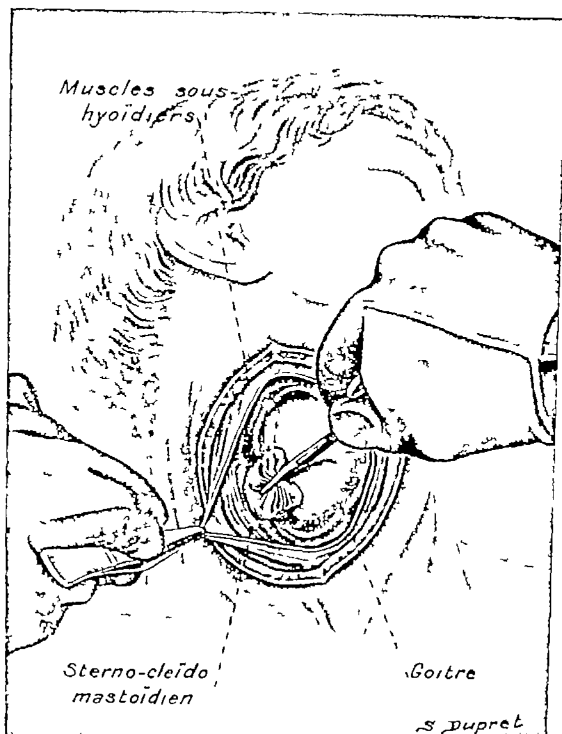


FIG 118.—TREATMENT OF EXOPHTHALMIC GOITRE.

Forcing the thyroid lobe through the opening in the subhyoid muscles; the operator frees the hypertrophied lobe with the compress.

Muscles sous-hyoïdiens=Subhyoid muscles. *Sterno-cléïdo-mastoïdien*=Sterno-cleido-mastoid. *Goitre*=Goitre.

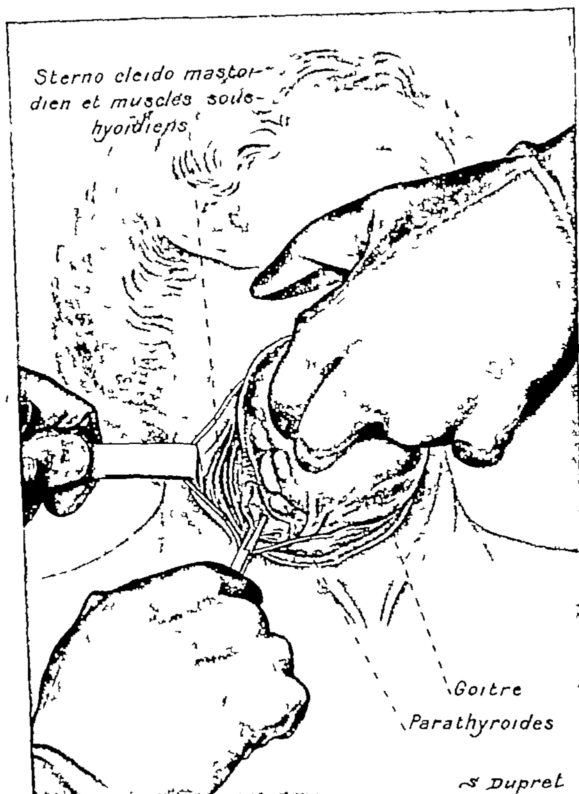


FIG 119 — TREATMENT OF EXOPHTHALMIC GOITRE.

How to expose the inferior thyroid Note the presence of the parathyroids.

Sterno-cléido-mastoïdien et muscles sous-hyoïdiens = Sterno-cleido-mastoid and subhyoid muscles. *Goitre* = Goitre. *Parathyroïdes* = Parathyroids.

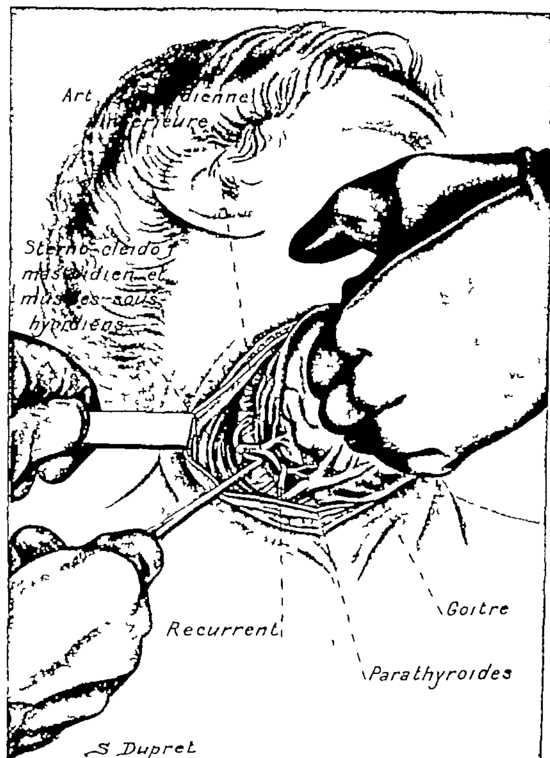


FIG 120 —TREATMENT OF EXOPHTHALMIC GOITRE.

Ligature of the inferior thyroid: the recurrent is well seen.

Art thyroïdienne inférieure = Inferior thyroid artery *Sterno-cléido-mastoïdien et muscles sous-hyoïdiens* = Sterno-cleido-mastoid and subhyoid muscles. *Récurrent* = Recurrent nerve. *Goitre* = Goitre. *Parathyroïdes* = Parathyroids.



FIG 121 —TREATMENT OF EXOPHTHALMIC GOITRE.

Freeing the upper pole by the compress Rôle of the retractor

Sterno-cléido-mastoïdien et muscles sous-hyoïdiens = Sterno-cleido-mastoid and subhyoid muscles. *Goitre* = Goitre. *Art thyroïdienne infre liée* = Inferior thyroid artery tied. *Parathyroïdes* = Parathyroids.

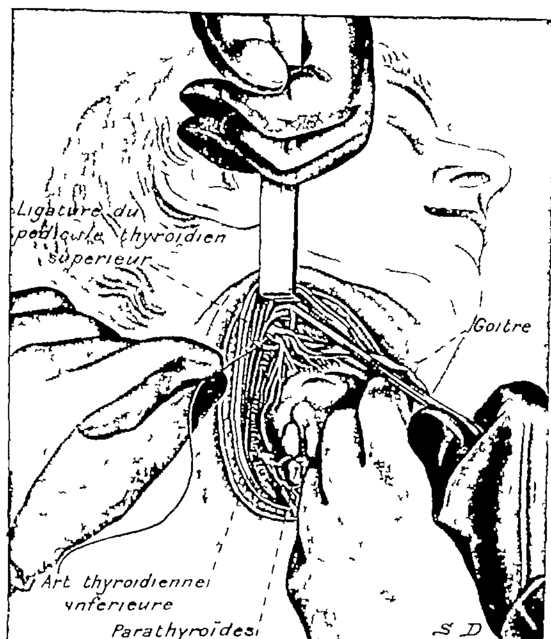


FIG 122 —TREATMENT OF EXOPHTHALMIC GOITRE.

Ligature of the superior thyroid If the operator wish to resect at once a great part of the parenchyma he should leave a fragment of the thyroid lobe suspended in the superior and inferior stump as in Fig 96

Ligature du pédicule thyroïdien supérieur—Ligature of the superior thyroid pedicle. *Goitre*—Goitre. *Art thyroïdienne inférieure*—Inferior thyroid artery *Parathyroïdes*—Para thyroids

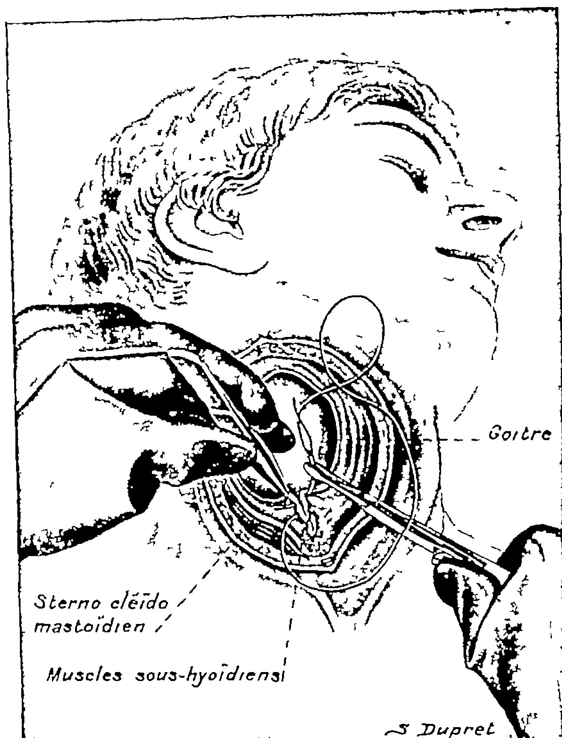
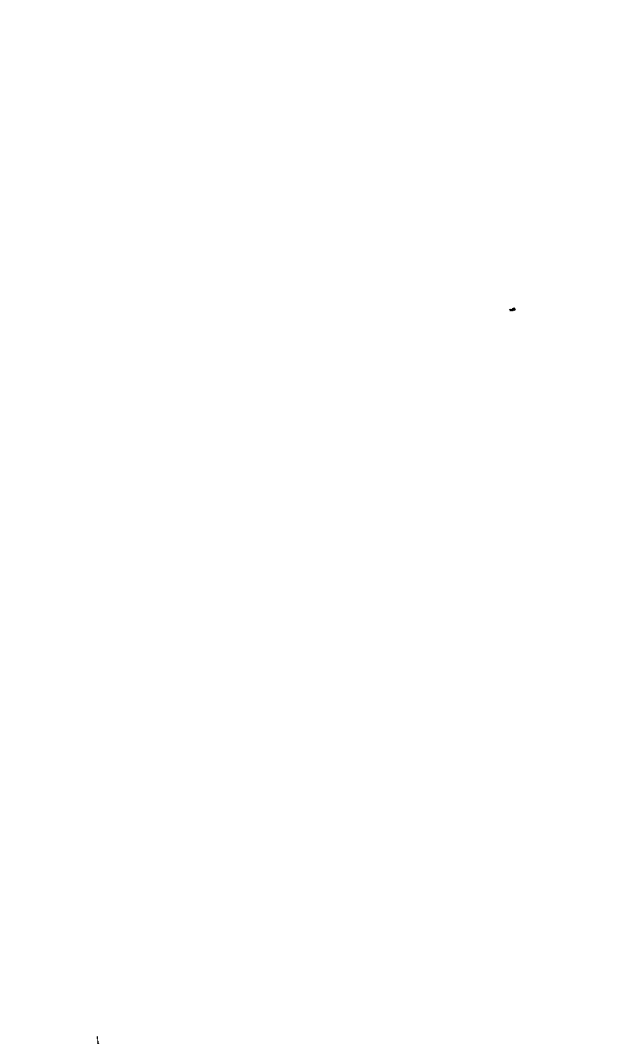


FIG 123.—TREATMENT OF EXOPHTHALMIC GOITRE.

Reparation with catgut of the subhyoid muscular level.

Goitre = Goitre *Sterno-cléido-mastoïdien* = Sterno-cleido-mastoid. *Muscles sous-hyoïdiens* = Subhyoid muscles



VI

GASTRIC SURGERY

Gastric and Duodenal Ulcer

Summary of the Operations

1. *Duodenal Ulcer*
   - Gastro enterostomy
     - Posterior trans meso colic, pre-colic, short loop at the dependent point
     - Marginal
     - Anterior
     - In Y or side-to-side
   - Burying the Ulcer
     - Combined with posterior gastro-enterostomy or with Balfour s operation.
   - Duodenectomy followed by Gastro-enterostomy
     - Implantation (end side)
     - Anastomosis, side-to-side
     - Anastomosis, end to-end.
   - Gastrectomy
     - Simple duodenal ulcer with marked hyperchlorhydria duodenal and gastric ulcer
2. *Gastric Ulcer*
   - Segmentary gastrectomy and gastro gastrostomy end to-end.
   - Gastro-pylorectomy followed by gastro-jejunostomy (Billroth) or by gastro-duodenostomy (Péan)
   - Thermo-cauterisation (Balfour)
   - Jejunostomy
3. *Jejunal Ulcer*
   - Gastro-jejunectomy
   - Simple removal of the gastro-enterostomy

Every patient complaining of gastric symptoms may be suffering from a gastric or duodenal ulcer or from reflex dyspepsia, the latter may be due to appendicitis, a Lane's kink ileo-cæcal tuberculosis, intestinal cancer, calculous cholecystitis or to a change in some distant organ (lesion of the nervous system renal insufficiency, etc) A thorough examination, not only of the stomach, but also of the intestines should be made by the X rays in every patient complaining of dyspeptic symptoms The surgeon ought to make a complete examination of the passage of the food through the intestine he does not require one radiogram, which is often useless and of no interest, except it show a gap in the bowel produced by a cancer or by a diverticulum (ulcus terebrans) It is a series of radioscopical

tests of the stomach and of the intestine which are required It is absolutely necessary for the surgeon to know if the patient suffer from intestinal stasis and how long the opaque mixture remains in the ileum, in the cæcum, in the ascending colon, and in the whole of the intestine If the ileum contain the barium more than ten to twelve hours after a meal, and especially if the last loop of the ileum be dilated, iliac stasis exists, if the large intestine be not entirely empty after forty-eight hours, stasis of the cæcum and of the colon is present.

It would also be useful in order to complete the radiographical history to have a picture of the kidney and ureters, as this might reveal a calculus It is still more useful, when possible, to have a radiogram of the biliary passages, calculus of which simulates cancer, but do not expect too much of the radiologist, the patient, or the doctor, for the present, be content with a complete examination of the digestive process.

CHEMICAL EXAMINATION —This is indispensable. It is necessary to know what is the degree of acidity of the gastric contents, and the different chemical details, and the curve of acidity A single tubage is sufficient, provided it is followed by a series of nine examinations in an hour and a half with Einhorn's tube.

EXAMINATION OF THE NERVOUS SYSTEM —This should be complete, and may discover the presence of tabes fruste

Examination of the blood may reveal azotæmia, search for syphilis is indispensable A great number of ulcers are syphilitic, and require mercurial treatment.

EXAMINATION OF THE URINE.—*Never forget to look for acidosis* which exists in subjects in a low state of health, and requires antacid post-operative treatment

In addition, the surgeon must know that the patient, once operated upon, is not yet a normal subject and cannot eat as he will, in spite of his appetite and the health he claims The ulcer was a morbid change the fact that the clinical symptoms are removed does not necessarily mean removal of the cause which has produced them. Besides, if secondary jejunal ulcer (5 per cent) is to be avoided, the patient must for six months be careful of his food and abstain from albuminoid substances. He can eat fatty foods, starch, sugar, but no chlorides (Léon Meunier) etc

Duodenal Ulcer —What operations can be performed for duodenal ulcer ? That depends upon the operator and on the patient.

A surgeon who operates little on the stomach will do well to have recourse only to the most simple gastro-enterostomy short-loop posterior trans meso-colic gastro-jejunal anastomosis as near as possible to the great curvature and to the pylorus, if at the same time he can bury the ulcer under two or three stitches in the serous surfaces, he should do so We have observed in the course of our career two cases of perforation of the duodenum after operation, which would not have occurred if we had buried the ulcer But if this present difficulties, it is better not to do it We do not advise the classic method of exclusion of the pylorus by pre-pyloric division, as formerly done We discountenance it for several reasons because jejunal ulcers are more frequent after this operation, and because in place of 1 per cent deaths, as by Balfour's method or by gastro-enterostomy, it gives a mortality of 5 per cent., again, it is unnecessary to increase the risk of operation for a problematical benefit Besides, pyloric exclusion is sufficiently obtained by simply burying the duodenal ulcer, which puckers and partly obliterates the intestine. Gastrectomy is the best way of excluding the pylorus, followed by a gastro-enterostomy, which is not more serious than simply dividing the stomach Experience shows it is even less serious, it is indicated in cases with marked hyperacidity

Is simple gastro-enterostomy the ideal operation suitable to all cases? No a skilled surgeon will have recourse to one of the following different operative procedures, each of which has its indications

(*a*) DUODENECTOMY —Given a belly with supple walls and a movable and flexible duodenum, resect the ulcerated segment as well as the pylorus. Close in a cul-de-sac the gastric and jejunal extremities and complete the operation by a gastro-enterostomy If the surgeon find sufficient duodenal material to make an end to-end suture, this direct physiological anastomosis is the better If it appear to be difficult, laborious and serious, abstain. Simple gastro-enterostomy gives a mortality of 1 per cent and 75 per cent. of complete cures. Be content—it is safe to operate again six months later if the patient be not cured

(*b*) GASTRECTOMY —If a duodenal and a gastric ulcer co-exist, it is necessary to resect the duodenum, the pylorus, and a part of the stomach at the same time. If the stomach be healthy, and if the ulcer be in the duodenum only, there are some cases where it is necessary to resect the small tuberosity of the apparently healthy stomach. Why? Because in cases with marked hyperacidity there

are risks of a jejunal ulcer forming some months later, because, by suppressing a part of the hyperpeptic stomach, hypopepsia often results, and this prevents the formation of a jejunal ulcer It is unnecessary to trouble about the duodenal ulcer itself, it is cut off by the gastric resection, the gastro-jejunal anastomosis is made by end to-end implantation, or side-to-side, according to the custom of the operator, or, better according to the anatomical conditions already existing

(c) Thermo-cauterisation —If the ulcer bleed, perform posterior gastro-enterostomy, and if the duodenum be not sufficiently mobilised to be removed, cauterise the ulcer, suture its edges, and bury it. This is to be done by three stitches of catgut suture, which include the marginal vessels of the duodenum Inclusion of these vessels establishes a barrier between the cauterised ulcer and the peritoneal cavity, and at the same time renders the duodenal segment bloodless

(d) Marginal Gastro enterostomy in Y —The ideal gastro-enterostomy is the one situated at the most dependent part of the stomach, as near the pylorus as possible, this point is its inferior border, this border is followed by the vessels, complete separation of which permits of the jejunal loop being anastomosed to the inferior border of the stomach. This procedure has not only the advantage of placing the opening at the lowest point, but also of avoiding all hæmorrhage in the stomach after the operation, since by stripping the vessels they are suppressed.

The operator who intervenes for a duodenal ulcer must *not omit* to examine the gall bladder—often gall stones are also present, cholecystectomy should be performed at the same time as the *operation on the stomach*

Relapses —We have had to operate again on a certain number of gastro-enterostomies for duodenal ulcer, performed by our confrères or by ourselves in which no improvement had taken place. We have then noticed the following lesions

(a) *Anastomosis of the Stomach with too Long a Jejunal Loop* — In one case the gastro-jejunal anastomosis had been made 60 centimetres beyond the duodeno-jejunal angle

(b) *Calculous Cholecystitis* —The gall bladder had neither been explored nor removed.

(c) *Co-existent Gastric Ulcer* —We do not know if the operator had noted the presence of a gastric ulcer as well, in every case the latter had been left, and only secondary gastrectomy cured the patient.

(*d*) *Secondary Jejunal Ulcer* —This is extremely frequent (5 per cent.) and necessitates resection of the jejunal loop and of the stomach (gastro-jejunectomy), or removal of the gastro-enterostomy

(*e*) *Subsequent Ascent of the Opening* —An operator had performed gastro-enterostomy at the dependent part of the stomach, the correct thing to do, but the stomach, formerly very dilated, had gradually retracted after the anastomosis, and the opening had ascended very high up, the gastric contents were badly evacuated A gastro-pyloric resection between the anastomosis and the duodenum should be performed There is no danger

(*f*) *Intestinal Stasis or Chronic Appendicitis* —In certain patients gastric or duodenal ulcer followed Lane's disease, and very frequently the ulcer was operated upon and cured but reflex dyspeptic symptoms persisted, owing to the presence of a kink or from chronic appendicitis We have performed secondarily sometimes appendicectomy, sometimes a short-circuit, and sometimes colectomy, which have finally removed the symptoms

Gastric Ulcer —Gastrectomy is the operation of choice—not simple resection of the ulcer, but either removal of the pylorus and of the whole extent of that part of the stomach the site of the ulcer, or resection of the diseased gastric border After gastro-pylorectomy, if the duodenum be long and supple and if the gastric stump can be easily brought down the best proceeding is end-to-end anastomosis (Péan s operation) After annular gastrectomy terminal gastro-gastrostomy is nearly always easy and efficacious. If the extremities do not come into good apposition, gastro-enterostomy should be performed with implantation of the gastric stump into the convexity of the jejunum. Should the gastro-enterostomy be trans-meso-colic or precolic ? That will depend upon the anatomical conditions. Generally, it will be the former, and if there be any doubt as to the satisfactory discharge of the stomach contents the operation should be completed by a jejuno-jejunostomy, this can be made by a button or by a suture. Personally, we perform Balfour s operation less and less, but we consider it a good operation in patients rendered weak from hæmorrhage, or in the hands of surgeons not well versed in the performance of gastrectomy At a minimum risk it gives good results, especially if completed by a gastro-enterostomy The indications of each method are not identical and hardly allow of general statements Balfour's method—*i e.* thermo-cauterisation of the ulcer, followed by burying

it—is an excellent operation in acute cases, *i e*, those which bleed or threaten perforation. If the ulcer be situated in the duodenum, or if it has perforated or bleeds, destruction of the edges of the ulcer with the cautery, followed by burying it, may be indicated, and can cure the patient with hardly any risk A complementary gastro-enterostomy will be necessary if the stomach does not empty itself perfectly

Certain gastric ulcers offer great operative difficulties These are multiple ulcers, or those which are extensively adherent or terebrant ulcers (penetrating deeply into the pancreas or into the liver) Some extend very far towards the cardiac end, the small curvature is entirely destroyed The operations necessitated by such lesions incur greater risk than the ordinary ulcer in the middle line or in the pre-pyloric region of the small curvature. Often, in these cases, the surgeon prefers, from prudence or timidity, a jejunostomy *or a simple gastro-enterostomy, but this latter generally produces* no result The patient continues to suffer Without doubt, the immediate risk of a large gastrectomy is greater, but is it not better to risk 20 per cent. mortality (instead of 5 per cent) than to perform a palliative and insufficient operation which condemns the patient to a painful existence? If we were in the position of the patient we should not hesitate to prefer the serious operation with very great chances of complete cure, to a mild operation, often useless and insufficient.

Operations for gastric ulcer produce secondary jejunal ulcer less often than those for duodenal ulcer yet this complication can occur To avoid it the operator must employ a catgut and not a linen suture and wound the stomach and jejunum as little as possible, afterwards a post-operative diet (Léon Meunier) with very little nitrogenous food for six months should be instituted

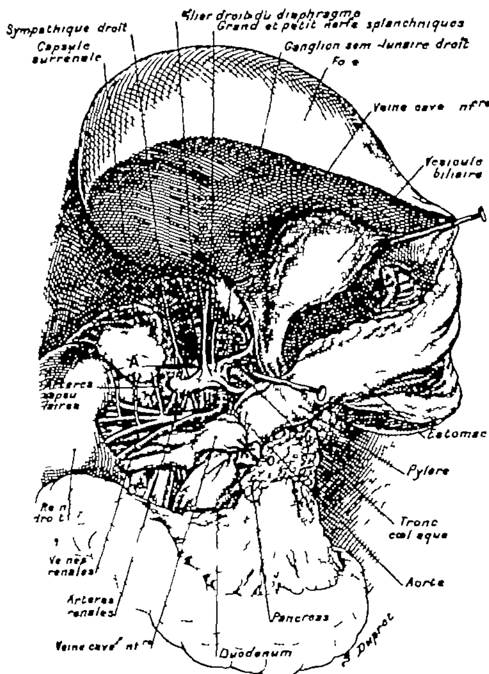


Fig 124 —Anæsthesia of the Right Splanchnic Nerve.

At A the needle is inserted 7 centimetres from the median line, under the twelfth rib, passes behind and inside the vena cava, and reaches the right semi-lunar ganglion Good position.

Sympathique droit—Right sympathetic *Pilier droit du diaphragme*—Right pillar of the diaphragm. *Grand et petit nerfs splanchniques*—Large and small splanchnic nerves. *Capsule surrénale*—Suprarenal capsule *Ganglion semi-lunaire droit*—Right semi lunar ganglion. *Foie*—Liver *Veine cave infre.*—Inferior vena cava. *Vésicule biliaire*—Gall-bladder *Artères capsulaires*—Capsular arteries. *Estomac*—Stomach. *Rein droit*—Right kidney *Pylore*—Pylorus. *Veines rénales*—Renal veins. *Tronc cœliaque*—Cœliac axis. *Artères rénales*—Renal arteries. *Pancréas*—Pancreas. *Aorte*—Aorta. *Veine cave infre*—Inferior vena cava. *Duodénum*—Duodenum.

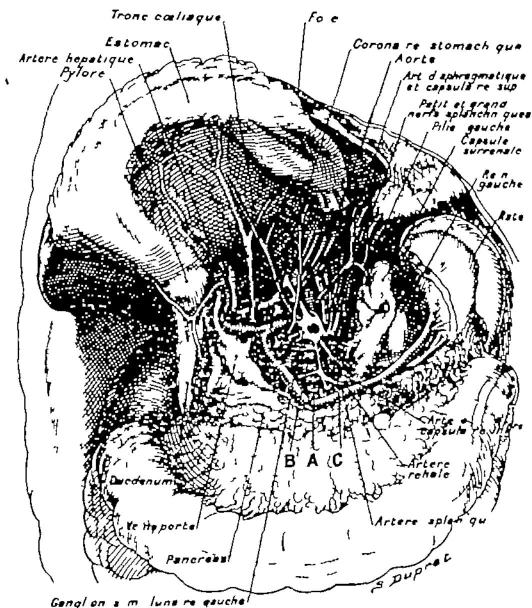


FIG 125.—ANÆSTHESIA OF THE LEFT SPLANCHNIC NERVE.

The needle is inserted under the twelfth rib but more or less distant from the middle line.

At A, the needle, inserted 7 centimetres distant, punctures the renal artery under the ganglion Bad position

At B the needle, inserted 5 centimetres distant, reaches the external border of the artery and is still below the ganglion.

At C, 3·5 centimetres, the aorta is internal and the needle reaches the semi lunar ganglion. Good position.

(After BILLET JALIFIER, LABORDE.)

Tronc cœliaque—Cœliac axis. *Foie*—Liver *Estomac*—Stomach. *Coronaire stomachique*—Coronary artery *Aorte*—Aorta. *Artère hépatique*—Hepatic artery *Art diaphragmatique et capsulaire supre.*—Superior diaphragmatic and capsular artery *Pylore*—Pylorus. *Petit et grand nerfs splanchniques*—Small and large splanchnic nerves. *Pilier gauche*—Left pillar of the diaphragm. *Capsule surrénale*—Suprarenal capsule *Rein gauche*—Left kidney *Rate*—Spleen. *Artère capsulaire infre*—Inferior capsular artery *Duodénum*—Duodenum. *Artère rénale*—Renal artery *Veine porte*—Portal vein. *Artère splénique*—Splenic artery *Pancréas*—Pancreas. *Ganglion semi-lunaire gauche*—Left semi lunar ganglion.

VII

GASTRO-PYLORECTOMY FOR PRE-PYLORIC ULCER

Gastro-duodenal Anastomosis (Pean's Operation)

THE first gastrectomies we performed for cancer, in 1898, were carried out by Péan's method We have given up this method, from fear of resecting insufficiently, and from the difficulty in apposing the gastric and duodenal ends Our excisions often appeared to be too sparing We have, therefore, like most of our colleagues, been in the habit of performing Billroth's operation—*i e*, closure of the gastric and duodenal ends followed by side-to-side anastomosis, or end-side implantation (Polya) For one year now we have returned to Péan's operation for pre-pyloric ulcer, reserving segmentary gastrectomy for ulcer near the cardiac end But when the ulcer is situated high up in the stomach, and when there is marked hyperchlorhydria we however perform a large gastro-pylorectomy, to lessen the chance of post-operative hyperchlorhydria, and decrease the possibilities of a jejunal ulcer It is our present practice, therefore, often to make segmentary gastric resections followed by gastro-gastric anastomosis or gastro-pyloric resections, with subsequent gastro-duodenal end to-end anastomosis (Péan's operation) We were satisfied with gastro-jejunal anastomosis after gastrectomy for ulcer, the immediate and eventual results were generally good often excellent, but we must allow the immediate results of end to-end anastomosis are still better The bad effects, regurgitation, vomiting, sometimes observed for some hours or days after Billroth s or Polya s method, are nearly always absent after end to-end anastomosis. Is that because we re-establish a nearly normal condition ? At any rate, facts show its advantages.

We perform few end to-end gastro-duodenal anastomoses, after resection for cancer because the resections are very large ones, both of the stomach and of the duodenum, we reserve it especially for gastrectomy for ulcer, but if after a gastrectomy for cancer the gastric tissue be still supple, and the duodenum elongated, we do not

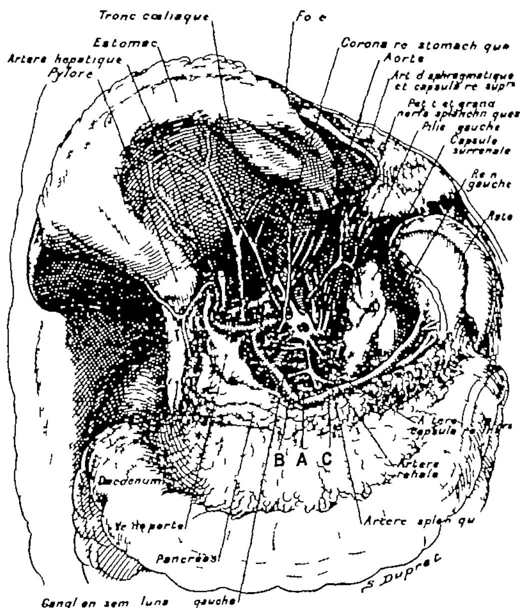


FIG 125 —ANESTHESIA OF THE LEFT SPLANCHNIC NERVE.

The needle is inserted under the twelfth rib but more or less distant from the middle line.

At A the needle, inserted 7 centimetres distant punctures the renal artery, under the ganglion. Bad position.

At B, the needle, inserted 5 centimetres distant reaches the external border of the artery and is still below the ganglion

At C 3 5 centimetres, the aorta is internal and the needle reaches the semi lunar ganglion Good position

(After BILLET JALIFIER, LABORDE)

Tronc cœliaque = Cœliac axis *Foie* = Liver *Estomac* = Stomach. *Coronaire stomachique* = Coronary artery *Aorte* = Aorta. *Artère hépatique* = Hepatic artery *Art dia phragmatique et capsulaire supre.* = Superior diaphragmatic and capsular artery *Pylore* = Pylorus. *Petit et grand nerfs splanchniques* = Small and large splanchnic nerves. *Pil er gauche* = Left pillar of the diaphragm. *Capsule surrénale* = Suprarenal capsule. *Rein gauche* = Left kidney *Rate* = Spleen. *Artère capsulaire infre* = Inferior capsular artery *Duodénum* = Duodenum. *Artère rénale* = Renal artery *Veine porte* = Portal vein. *Artère splénique* = Splenic artery *Pancréas* = Pancreas. *Ganglion sem -lunaire gauche* = Left semi-lunar ganglion.

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We perform few end to-end gastro-duodenal anastomoses, after resection for cancer, because the resections are very large ones, both of the stomach and of the duodenum, we reserve it especially for gastrectomy for ulcer, but if after a gastrectomy for cancer the gastric tissue be still supple and the duodenum elongated, we do not

hesitate to perform it, but it is exceptional. Radiological examinations after operation show always perfect function The appearance of the patient on the evening of the operation and on the following days, his evident euphoria, confirm this favourable impression

The following is the technique we have carried out (nearly entirely with the écraseur, which we have used for twenty three years) *Anæsthesia* —The choice lies between general spinal anæsthesia (Le Filiatre), or regional anæsthesia, which we prefer This includes infiltration of the abdominal wall, and injection into the splanchnic nerves.*

1 *Opening the Abdomen* —In the case of an ulcer high up, or of a narrow thorax, we do not hesitate to make a J incision which first follows the costal margin and then reaches the umbilicus by the shortest route. The cartilaginous edge is divided by the bistoury In cases where the duodenum is retracted and markedly to the right, we at once divide the wall of the abdomen tranversely at right angles, so as to make the gastro-duodenal suture as easy as possible

2 *Exploration* —The surgeon must look for the ulcer, to distinguish it, if possible, from a cancer, and to arrange his plan of operation. In cancer we strip the omentum from the colon and free the groups of glands which are removed with the stomach The great omentum is left If there be an ulcer exeresis is limited to the stomach only

3 The ulcer being found, *the great curvature is stripped* with a compress (Témoin), commencing at the left side, to cause as little bleeding as possible. (Descomps explains the spontaneous hæmostasis of the torn vessels by the oblique direction of the arteries from left to right.)

4 *Stripping of the Small Curvature with the Compress* —One or two ligatures are often necessary

5 *Écrasement and Division of the Stomach* —According to the Figs 142 146

6 *Division of the Duodenum close to a Pair of Strong Forceps*

7 *Partial Closure of the Stomach* —First by a through-and through suture buried under a suture of the serous surfaces The small curvature above the division where it has been stripped of the

* Anesthésie régionale " Pauchet Sourdat Labat 3rd edition. Paris, 1920 We infiltrate the wall with anacaine, which procures analgesia for forty-eight hours and greater comfort afterwards.

small omentum should be looked at carefully, for some branches of the coronary artery may bleed. The operation should not be continued until all bleeding has been stopped at this point

8 *Paring the Lower Edge* —After the upper two-thirds of the gastric edge has been sutured, the open part of the organ is often irregular and cuneiform, it must be made level in order that the end to-end anastomosis may be perfect End to-end anastomosis permits of no imperfection. A not over careful surgeon may cure his patient by a Billroth's operation, provided he takes sufficient care a more or less perfect result will be obtained with a more or less well functioning organ and with no risk of killing the patient. A Péan's operation requires more skill and attention to minutiæ, no detail can be neglected

9 *Posterior Suture of the Serous Surfaces* —The operator should first make two terminal stitches as a foundation The assistant should pull on them, so that the two serous surfaces are well coapted Usually it is necessary to make use of a very fine Doyen's curved needle, in a needle-holder, in order to make this suture well.

This is the most delicate part of the operation, because a stomach, often with thick walls, has to be sutured to a duodenum, whose walls are generally thin. The stitches should not perforate or cut, they should be as close as possible.

We advise surgeons not very skilled in the operation to make an interrupted suture with a small, new and fine Reverdin s needle in good order We advise them also to make use of firm and fine thread and not catgut, although the latter is on principle, superior, but the risks of peptic ulcer in similar cases are quite slight the operator should use catgut over the through and through continuous suture, which in the present case is not so necessary as in a gastro-enterostomy for duodenal ulcer

10 *Posterior Through-and Through Suture* —Two catgut foundation stitches should be made, the assistant should draw on them, and a button hole suture which should include the thickness of the gastric and duodenal walls should be applied

11 *Anterior Through-and Through Suture* —This should be a buttonhole stitch This as for the posterior level, should include all the walls of the stomach and duodenum.

12 *Anterior Suture of the Serous Surfaces* —This should be a continuous suture with slowly absorbable catgut

13 *Additional Stitch at the Upper Angle of the Wound,* in case the suture should become loose. If these directions be carried out

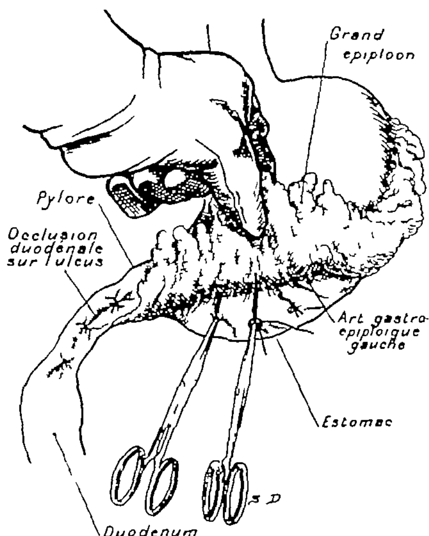


FIG 128 —DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

The ulcer is completely buried. Note the duodenum is as a result contracted, and a gastro-enterostomy is necessary. Picking up the vessels to avoid hemorrhage from the edge of the stomach during gastro-enterostomy

Grand épiploon = Large omentum. *Pylore* = Pylorus. *Occlusion duodénale sur l'ulcus* = Closure of the duodenum over the ulcer. *Art. gastro-épiploïque gauche* = Left gastro-epiploic artery. *Estomac* = Stomach. *Duodénum* = Duodenum.

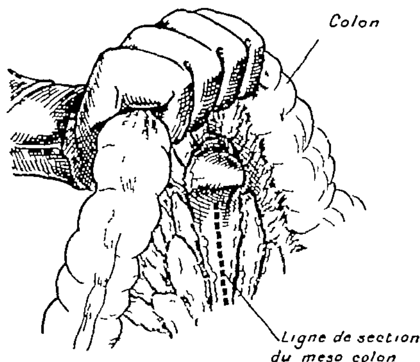


FIG 129 — DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

Posterior trans-meso-colic gastro enterostomy How to incise the meso-colon in a non-vascular space

Colon = Colon. *Ligne de section du méso-côlon* = Line of division of the meso-colon.

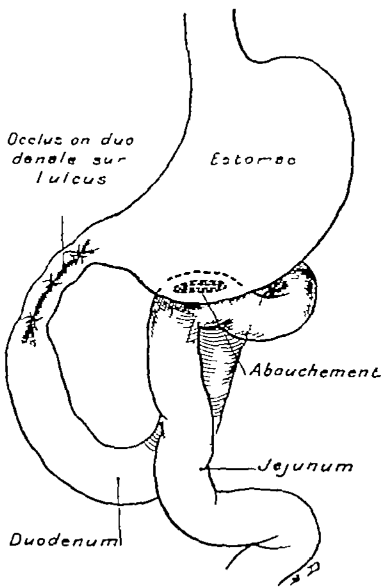


FIG 130 — DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

How to treat the anastomotic opening short loop near the great curvature and the pylorus. The gastric contents fall directly into the efferent jejunal loop

Occlusion duodénale sur l'ulcus = Closure of the duodenum over the ulcer. *Estomac* = Stomach. *Abouchement* = Anastomosis. *Jéjunum* = Jejunum. *Duodénum* = Duodenum.

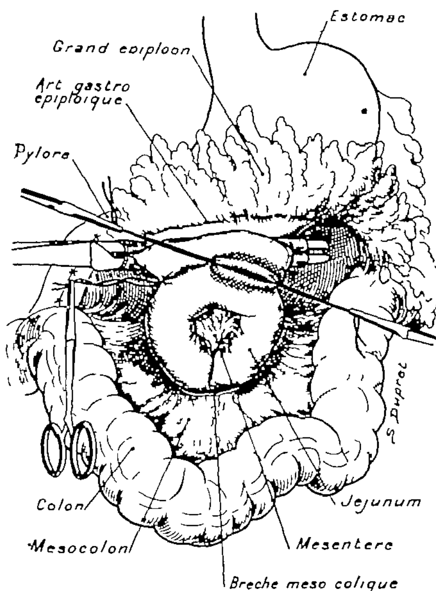


FIG 131 —DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

Formation of the posterior serous surface An enterostomy clamp on the stomach: no clamp on the jejunum Three fixation stitches of catgut to indicate the line of suture and hold the parts firm This suture passes from left to right the assistant draws on the two pairs of Rochard's forceps to stretch the two serous pads which are brought together by the posterior suture

Grand épiploon = Large omentum. *Estomac* = Stomach *Art gastro-épiploïque* = Gastro-epiploic artery *Pylore* = Pylorus. *Côlon* = Colon. *Jéjunum* = Jejunum. *Méso-côlon* = Meso-colon. *Mésentère* = Mesentery *Brèche méso-côlique* = Meso-colic opening.

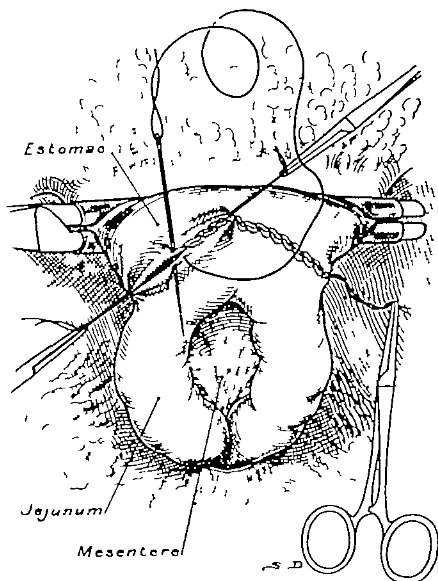


FIG 132 —DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY
Posterior continuous suture of the serous surfaces Note the rôle of the fixation stitches which stretch the serous pad and assist suturing

Estomac = Stomach. *Jéjunum* = Jejunum. *Mésentère* = Mesentery

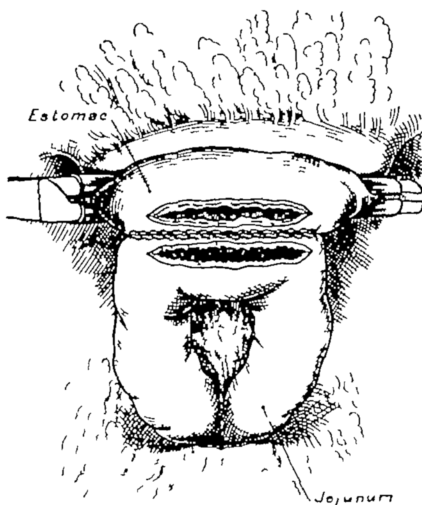


FIG 133 —DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY
Incision of the stomach and of the jejunum

Estomac = Stomach. *Jéjunum* = Jejunum.

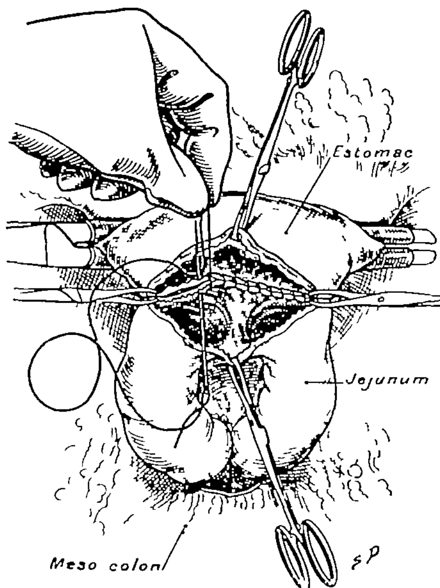


FIG 134 —DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

Through-and through posterior suture (button hole stitch). Note the rôle of Chaput s forceps, which make the parts firm

Estomac = Stomach. *Jéjunum* = Jejunum. *Méso-côlon* = Meso-colon.

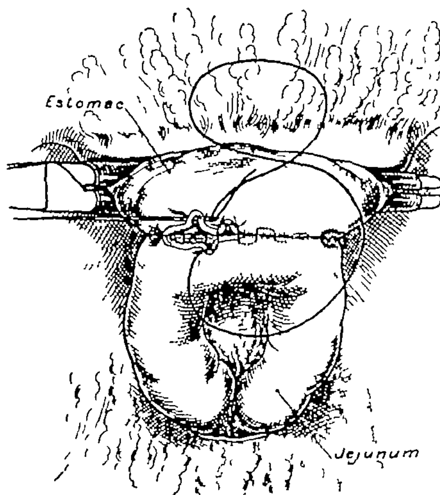


FIG 135.—DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

Anterior through-and through suture Note the way this suture is made to act as a hæmostatic and at the same time to invert the mucosa into the gastro-intestinal cavity

Estomac = Stomach *Jéjunum* = Jejunum.

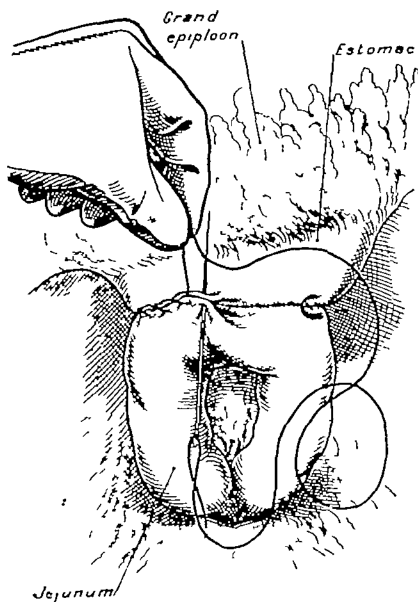


FIG 136.—DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY
Anterior continuous suture of the serous surfaces

Grand épiploon = Large omentum. *Estomac* = Stomach. *Jéjunum* = Jejunum.

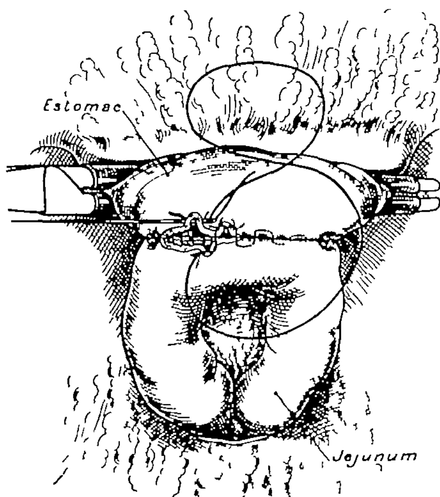


FIG 135.—DUODENAL ULCER. BURYING THE ULCER AND GASTRO-ENTEROSTOMY

Anterior through and through suture. Note the way this suture is made to act as a hæmostatic and at the same time to invert the mucosa into the gastro-intestinal cavity

Estomac = Stomach *Jéjunum* = Jejunum.

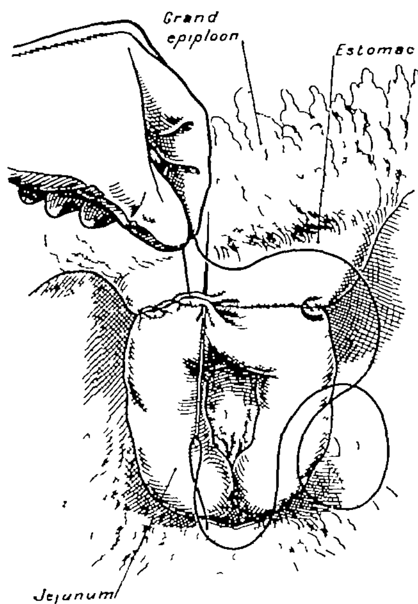


FIG. 136.—DUODENAL ULCER. BURYING THE ULCER AND GASTRO ENTEROSTOMY
Anterior continuous suture of the serous surfaces

Grand épiploon=Large omentum. *Estomac*=Stomach. *Jéjunum*=Jejunum.

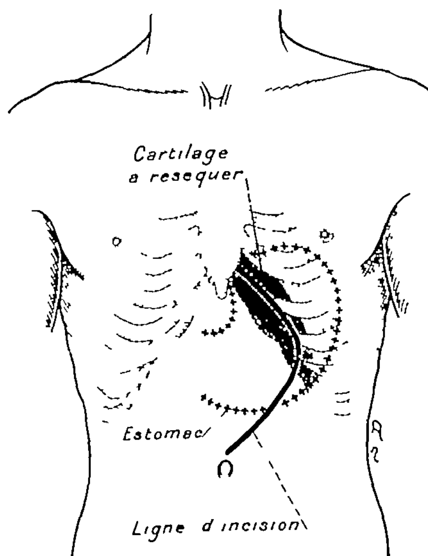


FIG 138 —GASTRECTOMY FOR JUXTACARDIAC ULCER.

Line of cutaneous incision in the form of a J It starts from the sternum is continued 1 centimetre above the costal border and curves back towards the umbilicus. The chondrectomy is indicated by the crosses. The thoracic wall is thus rendered supple and allows of separation of the edges

Cartilage à réséquer=Cartilage to be resected. *Estomac*=Stomach. *Ligne d'incision*= Line of incision.

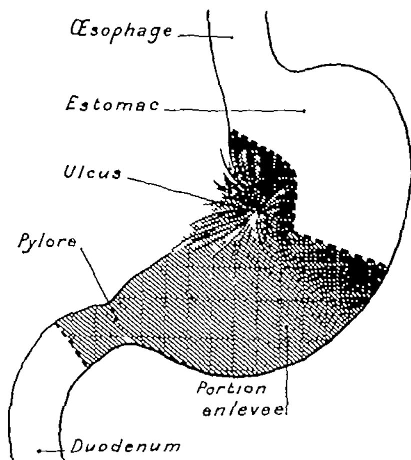


FIG 159 — GASTRECTOMY FOR JUXTACARDIAC ULCER.

The part of the stomach which must be resected The division commences at the side of the small curvature at the boundary of the cardia The healthy and movable part of the great curvature can be preserved.

Œsophage = Œsophagus. *Estomac* = Stomach. *Ulcus* = Ulcer *Pylore* = Pylorus. *Portion enlevée* = Portion removed. *Duodenum* = Duodenum.

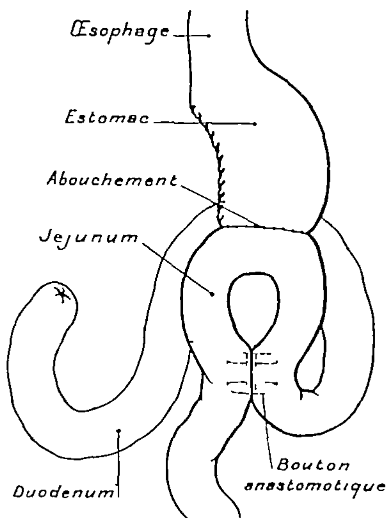


FIG 140 —GASTRECTOMY FOR JUXTACARDIAC ULCER.

Appearance of the operation when finished. The operator has sutured the concave part of the gastric opening, then the end of the narrowed part has been implanted into the convexity of the jejunum Complementary jejuno-jejunostomy

Œsophage = Œsophagus. *Estomac* = Stomach. *Abouchement* = Anastomosis. *Jéjunum* = Jejunum. *Duodénum* = Duodenum. *Bouton anastomotique* = Anastomotic button.

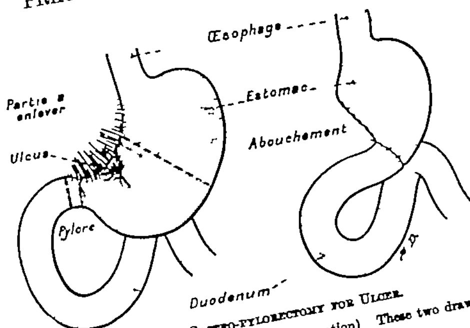


FIG 141 —GASTRO-PYLORECTOMY FOR ULCER.

End to-end gastro-duodenal anastomosis (Péan s operation) These two drawings sho
the nature of the operation.

Œsophage = Œsophagus. *Partie à enlever* = Part to be removed. *Estomac* = Stomach. *Ul*
= Ulcer *Abouchement* = Anastomosis. *Pylore* = Pylorus. *Duodénum* = Duodenum

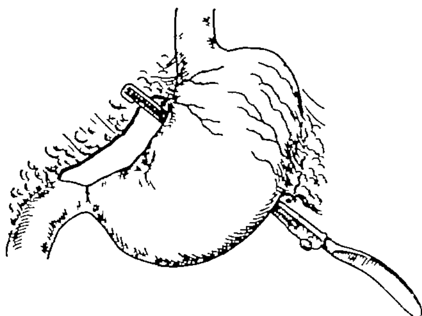


FIG 143.—GASTRO-PYLORECTOMY FOR ULCER.
How the first limb of the crushing forceps is applied

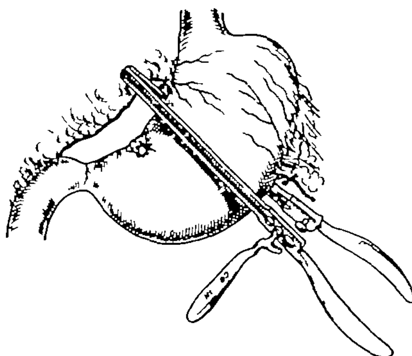


FIG 144 —GASTRO-PYLORECTOMY FOR ULCER.
How to apply both limbs of the crushing forceps and how to lock them

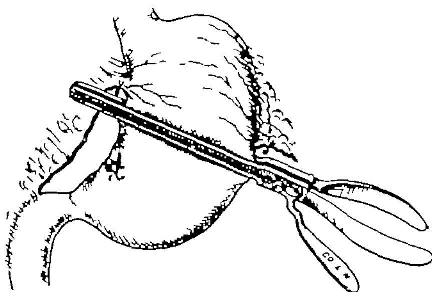


FIG. 145.—GASTRO-PYLORECTOMY FOR ULCER.
The crushing forceps is closed for écrasement.

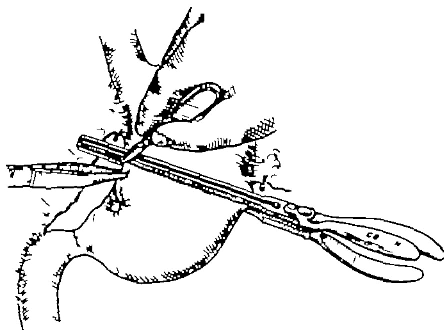


FIG. 146.—GASTRO-PYLORECTOMY FOR ULCER.
Division of the stomach close to the forceps.

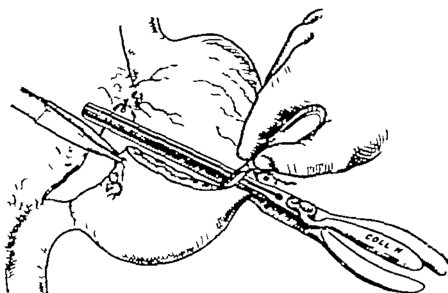


FIG 147.—GASTRO-PYLORECTOMY FOR ULCER.

Dividing the stomach, which has been emptied into the duodenum. If the pyloric part were full it would be necessary to apply a pair of enterotomy forceps

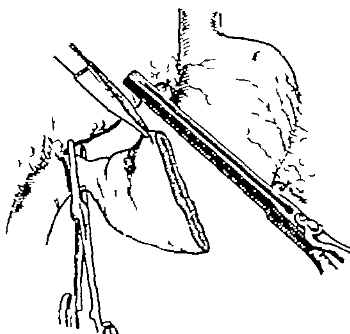


FIG 148.—GASTRO-PYLORECTOMY FOR ULCER.

A pair of strong forceps on the duodenum, close to the pylorus.

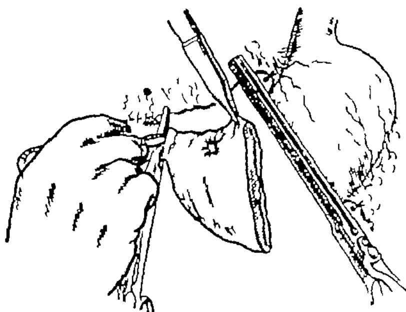


FIG 149 —GASTRO-PYLORECTOMY FOR ULCER.
Division of the duodenum close to the *forceps*

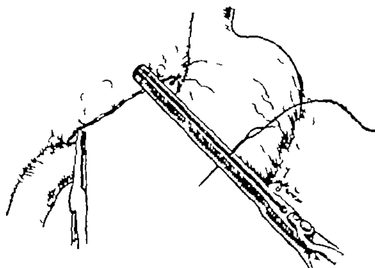


FIG 150 —GASTRO-PYLORECTOMY FOR ULCER.
iture of the upper two-thirds of the gastric edge; the needle passes into the slit of the écraseur piercing the tissues flattened by the forceps.

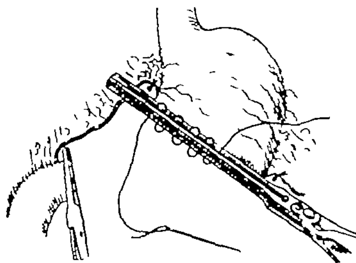


FIG 151 —GASTRO-PYLORECTOMY FOR ULCER.

Partial suture of the gastric edge with slowly absorbable catgut.

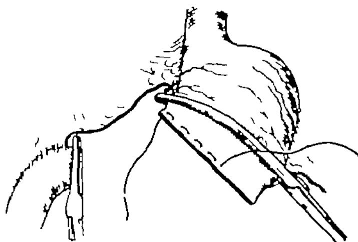


FIG 152 —GASTRO-PYLORECTOMY FOR ULCER.

The écraseur is withdrawn The enterotomy forceps are applied to the stomach some centimetres from the suture for a part of the organ remains open. The tissues of the edge pressed together by the forceps generally remain apposed for some minutes It is however wiser to apply a clamp, in case the two lips should come apart.

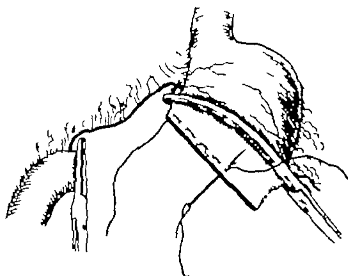


FIG. 153.—GASTRO-PYLORECTOMY FOR ULCER.

The operator completes the gastric suture.

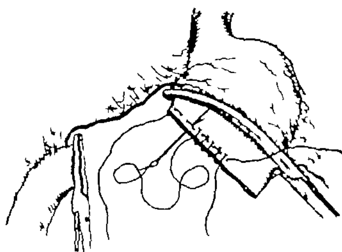


FIG 154.—GASTRO-PYLORECTOMY FOR ULCER.

Continuous suture, both hæmostatic and occlusive with slowly absorbable catgut The two ends of the first thread are knotted to the two ends of the thread which serves for the suture of the serous surfaces

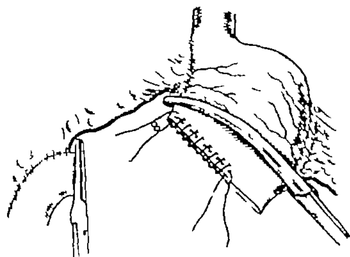


FIG 155 —GASTRO-PYLORECTOMY FOR ULCER.

Two through and through interrupted sutures make the reunited edge impermeable

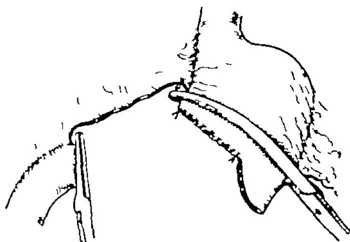


FIG 156 —GASTRO-PYLORECTOMY FOR ULCER.

After the suture is finished by a sero-serous suture there often remains a cuneiform strip of tissue hardly suitable for the gastro-duodenal suture.

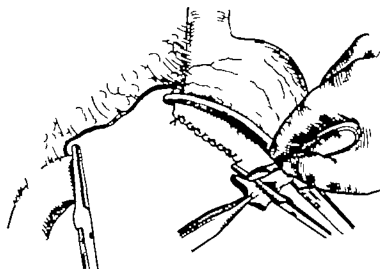


FIG 157 —GASTRO-PYLORECTOMY FOR ULCER.
Division of the cuneiform strip close to a pair of strong forceps.

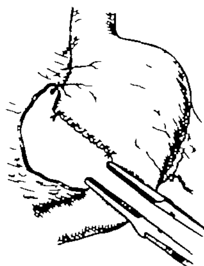


FIG 158 —GASTRO-PYLORECTOMY FOR ULCER.

Appearance of the gastric and duodenal ends after end to-end suture

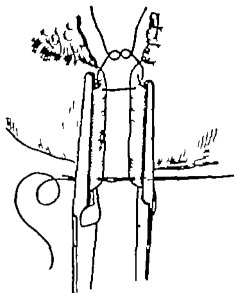


FIG 159 —GASTRO-PYLORECTOMY FOR ULCER.

Posterior suture of the serous surfaces. The operator applies two fixation stitches to the two ends of the serous edges

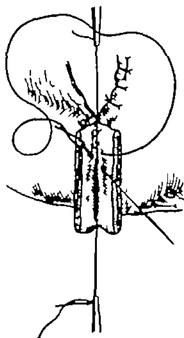


Fig 160 —Gastro-pylorectomy for Ulcer.

Rôle of the two fixation stitches which stretch the gastric and duodenal wall and permit the easy application of a continuous suture to the serous surfaces If it be necessary to work deeply among the tissues, a straight needle as above should be substituted for a curved needle on a needle-holder

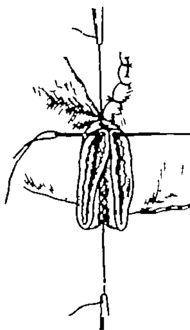


Fig 161 —Gastro-pylorectomy for Ulcer.

Through and through posterior suture with slowly absorbable catgut.

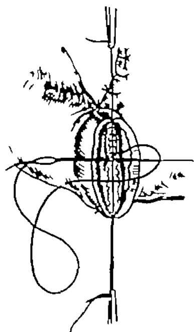


Fig 162.—Gastro-pylorectomy for Ulcer.

The through-and through posterior suture ought to be made with the button-hole stitch in order to contract as little as possible the gastro-duodenal anastomosis Note the two fixation stitches which allow the assistant to stretch the gastric or duodenal edges and to assist in the formation of the button-hole stitch

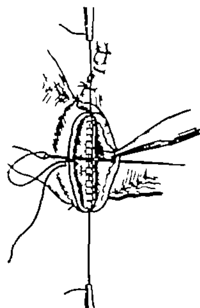


Fig. 163.—Gastro-pylorectomy for Ulcer.

The posterior button-hole stitch is finished. The operator begins the anterior suture with a median fixation stitch which includes the whole thickness of the tunics

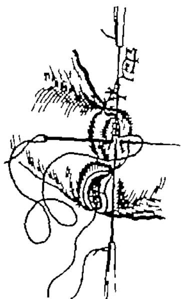


FIG 164.—GASTRO-PYLORECTOMY FOR ULCER.

Anterior through and through gastro-duodenal button hole stitch. *Note the usefulness of the middle and end fixation stitches which assist in the apposition of the lips.*

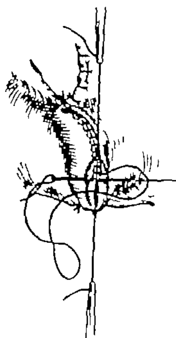


FIG 165.—GASTRO-PYLORECTOMY FOR ULCER.

The anterior through and through button-hole stitch is nearly finished.

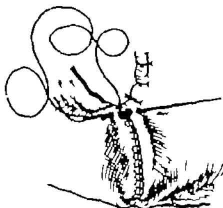


FIG 166.—GASTRO-PYLORECTOMY FOR ULCER.

Anterior suture of the serous surfaces, which should begin as near as possible to the upper fixation stitch.

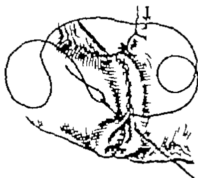


FIG 167.—GASTRO-PYLORECTOMY FOR ULCER.

The anterior continuous suture of the serous surfaces ought to be continued until the lower serous fixation stitch, here cut is reached.

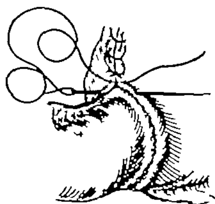


Fig 168.—Gastro-pylorectomy for Ulcer.

The gastro-duodenal suture is finished. It is probable no infiltration will occur But for the sake of caution it is a good thing to make a U stitch, including both the duodenal wall (upper border) and the two gastric sero-serous surfaces.



Fig 169.—Gastro-pylorectomy for Ulcer.

End to-end gastro-duodenal anastomosis (Péan s operation) Appearance of the suture of the serous surfaces when the operation is finished. Note that the gastric portion has been sutured by some interrupted stitches, and that the operator at the finish has made a superior commissural stitch uniting both the upper border of the duodenum and the two edges of the gastric incision so as to render the most fragile part of the line of the Y suture impermeable.

VIII

TUMOURS OF THE LARGE INTESTINE

These tumours may be caused by three conditions cancer, tuberculosis, and inflammation (pericolitis, with diverticulitis)—lesions justifying resection.

Colectomy for inflammatory tumours ought to be extended beyond the thickened walls. Only supple intestine can be sutured.

Tuberculosis is often situated on the ileo-cæcal segment Right hemicolectomy is the operation of choice if the mass of intestine be too adherent or fistulous, if the subject be cachectic or toxic from chronic obstruction, ileo-cæcal exclusion should first be performed, with the ileum implanted into the sigmoid or the transverse colon, and the abdomen treated by heliotherapy or deep radiotherapy Resection should be performed secondarily The surgery of cancer of the colon is encouraging Epithelioma of the colon grows slowly The mesocolic glands are slowly and later affected, generally the first group only is cancerous. The majority of the hypertrophied glands are inflammatory The immediate and eventual results are good.

Cause of Cancer of the Colon —It is the commonest cancer of the digestive tract, after that of the stomach and rectum. Every cancer is caused by the action of three factors (*a*) chronic irritation, (*b*) lowered vitality of the organism, which becomes a precancerous soil as a result of chronic toxæmia, alcoholism, syphilis, intestinal stasis, bad hygiene, or bad habits, (*c*) the specific germ, which is unknown. This "agent x" (Arbuthnot Lane) must find a soil for its cultivation, a local irritation and a lowered vitality, the one localises the disease, and the other prepares the *milieu*.

If we cannot actually suppress the germ x we can at least remove the local irritation of the mucous membrane of the colon, and prevent the lowered vitality of the organism, by prophylaxis against syphilis and intestinal stasis.

Rôle of Chronic Irritation —Everyone knows the part played in the development of lingual cancer by the stump of a tooth or by

leucoplakia, that of gastric ulcer on gastric cancer, of metritis on uterine cancer, and of mammitis on cancer of the breast.

Cancer of the colon develops on the parts exposed to irritation by the hard fæces resulting from constipation.

If we remove the irritation of the tongue by extraction of a carious stump or by excision of a leucoplakia, or if we resect an ulcerated stomach, we prevent the development of lingual or gastric cancer If we remove gall stones, we prevent cancer of the bile-ducts If we add mineral oil to the food of constipated individuals (known to be so or unconsciously), we prevent colitis and cancer of the colon.

Hoffman* has shown that cancer increases in proportion to civilisation. Whilst it does not exist in savages, it occurs in civilised races. The same applies to animals transferred from their free state to that of captivity If the savage do not suffer from cancer, it is, perhaps, from his open air life from constant exercise, from forced living under the sun but above all from the absence of constipation. The savage stretches himself out when he lies down, and squats when going to stool, which is never postponed. According to Sir Arbuthnot Lane, the position of civilised man, constantly sitting or standing, the sitting position for defæcation, the compulsory use of w c.'s for evacuation of the fæces are the causes of chronic constipation, which commences in infancy and is increased in the adult, especially in women.

The ingestion of mineral oil is, then, of great service to facilitate the passage of the intestinal contents through the pylorus, the duodenal jejunal angle, the end of the ileum and the flexures of the large intestine It renders the contents of the colon fluid, and lubricates the mucous membrane, its presence allows the excrements to overcome the obstacles due to adhesions and to spasms.

If you desire to avoid cancer of the large intestine, use paraffin frequently It is the king of remedies, is never injurious, and assures more than any other drug prolongation of life and freedom from disease (Arbuthnot Lane)

The vital resistance of each individual depends upon his heredity and on his hygienic conditions in early life, bad food and bad air, exposure to cold, sedentary habits, want of exercise bad surroundings, overwork, etc are many of the conditions producing a lowered vitality

* The Mortality from Cancer throughout the World, by F L. Hoffman, *Prudential Press, 1915*

INFLUENCE OF LANE'S DISEASE ON THE PRODUCTION OF CANCER —According to the factors which decrease or increase the vitality and the resistance of the individual, the disease of Lane (chronic intestinal stasis) will be different anatomically and clinically

We may mention the syndrome of Lane consists of three factors chronic constipation, delay in the passage of the intestinal contents as verified by the X rays, symptoms of stercoræmia, due on the one hand to intestinal auto-intoxication and, on the other, to the combination of symptoms caused by glandular insufficiency, ovarian, thyroid, and hepatic. The glandular alteration is, moreover, often due to chronic intestinal auto-intoxication

Anatomically, the disease of Lane is not always identical sometimes we find (type A, feeble individuals) the intestines free of adhesions and kinks, but elongated, narrowed, atonic, chronically inflamed sometimes (B type strong individuals) they, or parts of them, are glued and held together by new suspensory ligaments The persons with feeble stasis are predisposed to cancers of different organs, as breast, ovary, to the exclusion of intestinal cancers, on the contrary, in type B there is a strong predisposition to cancer of the colon, because the kinks and bands are causes of local irritation, of spasm, and of inflammation

In type A the anatomical condition does not provoke peristalsis but auto-intoxication, megrim depression, emaciation, and early old age Obstinate constipation and flatulence are explained by elongation twisting and bending of the intestine, spasm of the colon, and congestion and inflammation of the mucous membrane

In type B the symptoms of chronic intestinal stasis are of mechanical origin, auto-intoxication is less marked.

Between the two extreme types there are numerous intermediate kinds and combinations, which form many anatomo-clinical variations

Under the influence of the stasis due to hypertrophy of the rectal muscular tissue or to a colo-sigmoid kink, the colon above distends its walls yield, and the mucous membrane protrudes between the coats of the muscular fibres These mucous cul-de-sacs protrude under the serous coat they are diverticula If these latter close on the intestinal side or become filled with hard fæcal matter infection occurs, and diverticulitis is produced. Chronic diverticulitis may be the point of origin of cancer of the colon.

CLINICAL SIGNS OF CANCER OF THE COLON —Cancer reveals itself functionally by attacks of minor obstruction, or objectively by the

presence of a small palpable mass The other clinical signs are less important

Abdominal Tumour.—Abdominal palpation is most often negative. When the surgeon detects a tumour of the colon, it may be due to an ileo-cæcal tubercular mass, to a peri-colitis, or to an accumulation of fæcal matter above a cancerous stenosis More rarely the growth itself is palpable

Diarrhœa and Constipation.—Cancers of the right colon produce diarrhœa, those of the left, constipation

In the embryo, it may be recalled, the small intestine forms the segment destined to receive the food (œsophagus and stomach), the *middle* intestine the digestive, and absorbent organ (small intestine and right colon) and the posterior intestine gives rise to the colic portion which collects the discharges and expels them (left colon and rectum) While the function of the small intestine is to absorb solid food, that of the cæcum and of the ascending colon is to absorb 90 per cent of the liquids, hunger is thus appeased by the small intestine, thirst by the large (Moynihan) * The retention of water in the small intestine is necessary for the conveyance of the solid substances which it carries into the ileum. The valvulæ conniventes, constantly moving to and fro, turn alternate surfaces to the chyme to assist absorption. If the liquids were absorbed on their arrival in the stomach or in the duodenum, the passage of food through the ileum would be delayed.

Every neoplasm in the cæcum and in the ascending colon tends to contract them. In consequence of the obstacle, the intestine contracts behind the tumour and expels the liquids too rapidly, hence the diarrhœa. If, on the contrary, the neoplasm grows in the left colon, there is constipation.

Pain.—The muscular tunic of the colon fights against the obstacle, this spasm produces colic, followed by borborygmi, and then by relief Real pain is rare. The patient rather has a sense of uneasiness and discomfort which can often be localised to a spot corresponding to the site of the lesion it often points to the place where the colic begins and ends and where the liquids and gas escape through the obstacle

Hæmorrhage and Mucous Secretions.—The appearance of the fæcal matter is often altered its consistence varies according to the situation of the tumour, there may be discharge of mucus at

* "Remarks on the Surgery of the Large Intestine," by Sir Berkeley Moynihan, West London Medico-chirurgical Society June 27 1913

the time of, or after, evacuation. Hæmorrhagic discharge may show itself by clots, or as streaks adherent to the fæcal matter or floating in the mucus Chemical examination may reveal occult hæmorrhages These nearly always indicate cancer, in diverticulitis hæmorrhage is almost nil. Each time there is a hæmorrhagic dis charge, cancer of the large intestine can be diagnosed just as certainly as after a hæmatemesis there is justification for fearing gastric cancer In certain cases of cancer, above all in the right colon, occult, repeated, long-continued and undiscovered hæmorrhage may be accompanied by pronounced anæmia, without any apparent intes tinal symptoms

Radiographical Signs —Examination should be made after a meal and opaque injections, if obstruction exist, the accumulation of barium behind it forms a shadow generally clear and clubbed, since fragments of opaque pulp escape through the contracted portion and form small black points on the intestine If the neoplasm be situated in the cæcum or in the ascending colon there is but little delay in the passage of the barium even with marked constriction, because of the dilatation and hypertrophy of the cæcum and of the small intestine above the neoplasm. In the left half of the colon opaque injections give more clear information regarding the site of the tumour and of the state of the walls of the colon. The injection should be made slowly, according to Bensaude s method A nega tive examination is not conclusive evidence. We have on two occasions found tight strictures due to a growth which gave no alteration in the radioscopical image.

Intestinal Contractions —Malignant tumours of the large intestine are generally small and not palpable except there be an accumula tion of fæces above the stenosis or pericolic thickening from inflammation. To perceive the contractions of the colon fighting against the obstacle the intestine should be gently shampooed for five minutes then the hand lightly passed over the abdomen, it will detect the contracting and rumbling intestinal loops The cæcum may be dilated and distended even if the growth be situated in the sigmoid Peristaltic movements of the ileum in the form of waves can be recognised through the abdominal wall, the large intestine contracts more slowly like a parturient uterus, and may be recognised by its greater size.

Radioscopy of the Rectum and of the Colon —Cancer can be situated in any part of the large intestine—in the sigmoid, at the hepatic or splenic flexures or even a little above them, more than

presence of a small palpable mass The other clinical signs are less important

Abdominal Tumour.—Abdominal palpation is most often negative. When the surgeon detects a tumour of the colon, it may be due to an ileo-cæcal tubercular mass, to a peri-colitis, or to an accumulation of fæcal matter above a cancerous stenosis More rarely the growth itself is palpable

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In the embryo, it may be recalled, the small intestine forms the segment destined to receive the food (œsophagus and stomach), the middle intestine the digestive, and absorbent organ (small intestine and right colon) and the posterior intestine gives rise to the colic portion which collects the discharges and expels them (left colon and rectum) While the function of the small intestine is to absorb solid food that of the cæcum and of the ascending colon is to absorb 90 per cent. of the liquids, hunger is thus appeased by the small intestine, thirst by the large (Moynihan) * The retention of water in the small intestine is necessary for the conveyance of the solid substances which it carries into the ileum. The valvulæ conniventes, constantly moving to and fro, turn alternate surfaces to the chyme to assist absorption. If the liquids were absorbed on their arrival in the stomach or in the duodenum, the passage of food through the ileum would be delayed

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the time of, or after, evacuation. Hæmorrhagic discharge may show itself by clots, or as streaks adherent to the fæcal matter or floating in the mucus Chemical examination may reveal occult hæmorrhages These nearly always indicate cancer, in diverticulitis hæmorrhage is almost nil. Each time there is a hæmorrhagic discharge, cancer of the large intestine can be diagnosed just as certainly as after a hæmatemesis there is justification for fearing gastric cancer In certain cases of cancer, above all in the right colon, occult, repeated, long-continued and undiscovered hæmorrhage may be accompanied by pronounced anæmia, without any apparent intestinal symptoms

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Radioscopy of the Rectum and of the Colon —Cancer can be situated in any part of the large intestine—in the sigmoid, at the hepatic or splenic flexures, or even a little above them, more than

in them. Sigmoid cancer can be recognised by endoscopy, which allows of an exploration of 25 to 30 centimetres from the anus

Exploratory Laparotomy —The above symptoms may be present singly, or more rarely as a whole

To obtain lasting operative results after resection, it is necessary to make an early diagnosis, but our means are often insufficient The suspicion of a cancerous tumour is adequate reason for opening the abdomen Every time a patient has shown one of the preceding signs, laparotomy is compulsory Every time a patient has shown signs of obstruction, or minor obstruction, even temporary even if the symptoms have disappeared, laparotomy is obligatory On every occasion a patient has been operated upon as a matter of urgency, and a cæcal anus has been made, without exploration, it is necessary after the operation, even if the general health has improved, to make an exploratory laparotomy It is absolutely necessary to explain to the patient the reasons for this treatment Often, from fear of frightening him, we refrain from giving this advice, and the patient dies, a victim of our timidity

Varieties of Cancer of the Colon. ANATOMICAL VARIETIES —Cancer shows itself under two forms (*a*) fungoid, (*b*) scirrhous

(*a*) This is a true tumour not generally giving rise to stenosis, it occupies a limited area of the intestinal lumen, and is composed in part of superadded inflammatory elements, hence febrile and glandular reaction, with rapid progress

(*b*) Scirrhous cancer gives rise to annular stricture, which resembles a collar of scar tissue surrounding the intestine like string, above the stenosis the loop is dilated, the mucous membrane is sometimes ulcerated or ruptured, polypi form in the intestinal mucosa

CLINICAL VARIETIES—(*a*) *Cancer of the Right Colon* —This is generally a fungoid cancer There are few signs of obstruction, which is not astonishing, seeing the contents of the cæcum and colon are liquid diarrhœa is frequent, hæmorrhages rare Intestinal stasis is rarely observed at the beginning

The mass is palpable, the meso-colic glands hypertrophy, the patient complains of some pain and vague discomfort, the temperature is subfebrile (37 8° to 38°) Hæmorrhages, when they exist, are slight often recognised only on examination of the fæces There is loss of strength Radioscopy generally shows no stasis or lacuna

(*b*) *Cancer of the Left Colon* —This form produces stenosis, constipation, intestinal stasis, stasis may, moreover, exist with a

daily evacuation. On enquiry, the patient complains of past attacks of intermittent colic, examination of the abdomen reveals some peristaltic movements, with intestinal contractions, spasms, and splashing sounds The spasm above the stenosis may cause a wrong diagnosis of tumour, this pseudo-tumour resulting from spasm is intermittent, and yields to atropine, as is the case in the stomach opposite an ulcer of the small curvature.

INFLAMMATORY TUMOURS — *Diverticulitis* —In certain colons hernias of the mucous membrane protrude through the muscular tissue of the intestine Prominences the size of a pea or of a nut are then visible under the serous membrane, these are diverticula, in which fæcal matter accumulates Inoffensive calculi form in the absence of infection, if infection occur diverticulitis follows, which may end in perforation, peritonitis, abscess, or an inflammatory tumour which simulates cancer The intestine becomes hard, board like, and hypertrophied. Diverticula are usually met with in the sigmoid and in the descending colon, when infected, the following complications may ensue

Peri-colic Abscess —This simulates "left sided appendicitis," with abscess formation.

Inflammatory Tumours (*Pseudo-neoplasms*) —We have all of us removed tumours of the colon which, histologically examined, showed no neoplastic characters the diagnosis is not always easy, even during operation.

Internal or External Fistulæ —These follow abscess External fistulæ may be iliac or lumbar, internal frequenly open into the bladder or, in rare instances, into the small intestine. When situated in the recto-sigmoidal segment, diverticulitis produces an abscess in the upper part of the pelvis or in the ischio-rectal fossa, the fistulæ in this region may have a long track.

Cancerous Degeneration —Diverticulitis like every chronic in flammatory condition favours the formation of cancer The majority of cancers of the stomach are engrafted on old ulcers, diverticulitis conduces to cancer of the colon.

PROGNOSIS OF CANCER OF THE COLON —Colon cancer is "benign" its progress is slow glandular enlargement is late, the form which gives rise to stenosis—*i e.*, the fibro-cicatricial form—is less serious and more frequent than the fungoid form, which is a true tumour If operation be performed early, the prognosis is very often good. Prognosis improves, moreover, because of the

greater skill of surgeons and of the earlier performance of operation. But the immediate recovery has not a tendency to get better at the hands of the same surgeon Formerly he aimed, above all, at recovery from the operation, and for preference carried out palliative interventions (anastomosis and artificial anus) Now he looks more and more for radical cures and final results The mortality is not lowered for three reasons (*a*) because the operator is bolder and endeavours to obtain a radical cure when formerly he would have been content with the formation of an artificial anus or of a *short-circuit*, (*b*) because a great number of cases, formerly considered inoperable, are now operated upon, and the advanced ones are necessarily more serious, and (*c*) because, lastly, surgeons are more versed in the complexity of abdominal surgery, and treat not only the principal lesions, but look for and treat the accessory and concomitant morbid conditions, formerly they limited their explorations and curative remedies to the suspected region only They missed, in this way, the existence of another organ, because it *was not explored* *Every surgeon who opens the abdomen ought* not only to make an exact diagnosis, but a complete one, it is not sufficient to discover a duodenal ulcer, he must ascertain if there be not at the same time an intestinal kink, a cholecystitis or an appendicitis The aim of every modern operator should be to make a complete surgical diagnosis and an immediate permanent cure.

To return to the question of the seriousness of the operation, we repeat that for cancers of the colon the idea of operability and *future* curability ought to predominate over that of mild immediate measures The two aims of the surgeon ought to be to rescue even the obstinate and difficult cases and to cure permanently or for a long time *the easy ones—i e, extend the limits of cases operable* and the duration of the cure. Operation on the advanced cases gives an immediate larger mortality, but in the end the surgeon cures more patients and gives them more chances of complete cure. *For example* if we only operate on easy cases and non adherent cancers of the colon, we shall have perhaps 5 per cent of deaths, and 50 per cent of cures of more than five years but to obtain this brilliant result we *refuse intervention in* a great number of cancers, amongst them those which, with greater risks and without guarantee of a long survival, would have, however, by our increased zeal, obtained appreciable benefit.

Moreover if the bold operator could compare his mild cases with the same mild cases treated by a timid surgeon, if the latter mortality

was 5 per cent., the former in similar cases would have a less mortality because his skill would be greater To sum up, the limits of the operation are very elastic, they depend on the pluck and energy of the surgeon, the indications vary with the operator as much as with the patient

SURGICAL TREATMENT OF CANCER OF THE COLON —The efficiency of surgery on cancer of the large intestine depends on four factors

(a) Relative innocency of the cancer suggesting an eventual cure, especially if the treatment be early

(b) Possible separation of the intestine by dissection of the colon from the parietal peritoneum and from the omentum, extensive mobilisation, permitting removal of a considerable length of the intestine, without any difficulty in restoration.

(c) Vascular supply of the intestine, preserving its nutrition on a large scale, if a band of meso-colon containing the marginal artery be preserved (Hartmann)

(d) Lymphatic supply, the region of which is well known for every segment of the colon, allowing of the removal *en bloc* of a long intestinal segment, with the whole of the corresponding vessels and glands (Bernard Cunéo)

It is rare for cancer of the colon to be very extensive, the tumour is generally small and limited. The wall is rarely cancerous for more than 3 centimetres above and below the lesion, but a very long intestinal segment must be removed The adhesions of the tumour to the neighbouring tissue (abdominal wall ileum) may cause difficulty in extirpation and necessitate removal of a segment of the small intestine, of the ureter of the ovaries, of the abdominal wall etc

VASCULAR DISTRIBUTION —Well studied by Hartmann. The vascular supply of the large intestine is feebler than that of the small, supplied by the freely anastomosing arches These anastomoses, however exist in the colon at the right and left flexures and in the pelvic portion. On resecting, the operator ought to cut a part of the intestine opposite a chief colic branch The blood supply will be direct The end of the ileum for 20 to 25 centimetres is as poorly supplied as the colon. There is only one marginal anastomosis in the terminal part of the ileum, and this joins the iliac recurrent branch along the mesenteric border of the ileum. The surgeon should note the poor vascular supply and if there be fear of ischæmia of the end of the small intestine, he should make the division 25

centimetres from the cæcum, where the vascular loop is double The vascular supply of the ileum is found again in the pelvic colon. This part of the colon, then, is better supplied with blood

Whilst in the loins the ascending and descending colon are fixed by two *fasciæ to the lumbo-iliac fossæ*, the tranverse colon and the sigmoid are free and movable The fixity of the colon is especially marked in the splenic and hepatic flexures The adherent fascia of embryonal origin can be freed by simply dividing it, followed by gentle backward pressure with a compress, a manœuvre which mobilises the large intestine as far as the ileum, and gives to the meso-colon its primitive size, no vessel bleeds during this separation if it be done gently with the compress

The lymphatics and glands are *collected along the arteries* The large intestine is supplied by branches of the superior and inferior mesenteric The ileo-colic artery, which is the termination of the mesenteric trunk, supplies the last 20 centimetres of the ileum, the cæcum, and a part of the ascending colon It gives rise to the *right colic artery, which supplies the appendix, the ileum and the* colon, and the middle colic artery to the tranverse colon, anastomosing with the ascending branch of the left colic artery The inferior mesenteric artery arises from the aorta at the level of the second lumbar vertebra, below the inferior border of the duodenum, and gives off the left colic artery, which divides *immediately into two* branches, one for the left extremity of the transverse colon, where it anastomoses with the middle colic, and the other forms an arch by its anastomosis with the first sigmoid artery The sigmoid arteries one to four in number, arise from the inferior mesenteric and expand over the *meso sigmoid, each division divides into two* branches, ascending and descending these anastomoses forming a series of arches, on the convexity of which some secondary branches arise. The anastomoses of the branches of the left colic and the left sigmoid arteries form a marginal artery without branches, extending from the left angle *of the colon to the* end of the sigmoid The inferior mesenteric ends by forming the superior hæmorrhoidal arteries which enter the wall of the rectum As a result of the supply to the colon and to the rectum the following surgical sequelæ occur if the inferior sigmoid and the superior hæmorrhoidal arteries be tied separately, the circulation in the marginal artery is destroyed and gangrene will result in the part of the *intestine supplied* by these two vessels

If the ligature be applied to the trunk of the inferior mesenteric,

above the last sigmoid artery, this latter will supply, with the blood from the marginal artery, the trunk of the superior hæmorrhoidal. The point of junction between the superior hæmorrhoidal and the inferior sigmoid artery is then, the "critical point" below which ligature of the superior hæmorrhoidal or of the lower sigmoid artery can produce gangrene of the rectum

The reader should take note of this practical hint tie the vessels as one likes, but keep the marginal artery in the whole of the intestine intact, it is rare, in that case, for dangerous ischæmia to be produced

The marginal artery, by its anastomosis with the left colic, is sufficient to supply the descending colon and the sigmoid, even if the inferior mesenteric has been tied at its origin.

Personally, when we have to resect, happen what may, and when the time has come to re-establish the continuity of the intestine, we study the appearance and colour of the extremities of the colon If the intestine be anæmic or violet in colour we make a further resection, if it be rose-coloured and perfectly well supplied we do not excise any more

Lymphatic Distribution —Well studied by Bernard Cunéo On principle, every cancerous organ ought to be removed *en bloc* with its lymphatics with the vessels, glands and tissue containing them.

In practice it is unnecessary to perform excision of the intestine and mesentery, based on a too strict interpretation of the data afforded by anatomy It stands to reason that in cancers of the intestine the whole lymphatic region of the diseased segment is infected, nearly always the first glandular mass is cancerous, the other glands are more often inflammatory If it be desired to remove the glands as completely as we endeavour to do in cancer of the breast or of the uterus, the so-called radical cure would make the operation on the colon more serious it is preferable to trust to the feeble tendency for the lymphatics to be affected. Provided we remove the first bunch of glands, and make a large resection of the intestine itself 10 centimetres at least above and below, the rest matters little at the price of a small immediate mortality satisfactory present and future results will be obtained

Technical Generalities —Suture of the large intestine is more delicate than that of the small intestine and of the stomach The tunics of the colon are thin and irregular whilst the muscular layer

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Technical Generalities —Suture of the large intestine is more delicate than that of the small intestine and of the stomach The tunics of the colon are thin and irregular, whilst the muscular layer

is strengthened at the level of the longitudinal bands, it is thinned at the sacculi. This thinness is exaggerated in certain forms of intestinal stasis The sutures are fragile on these thin, atrophied walls. The operator should use fine needles and fine thread, handled with great gentleness He should avoid perforating stitches, for the contents of the large intestine are septic Infection would result, either immediately in peritonitis, or five or six days later from giving way of the suture. End to-end anastomosis on principle is preferable to side-to-side anastomosis, but the latter can be performed in cases of a fat unequal, irregular intestine, it should, then, be carried out at the longitudinal bands The best made end to-end suture will, however, be protected by fixing it to the abdominal wound or by wrapping some mesentery around it.

A further difficulty in suturing the colon is the presence of epiploic appendices, doubtless, they can assist in making firm an end to-end anastomosis if they can be used, but it must be remembered that at these appendices there are often some diverticulæ penetrating into the fatty mass, they must not be tied close to the intestine without dividing them with the cautery, or they can first be freed by the knife, and the small vessels be tied separately

The large intestine often presents anomalies in shape, size and length, sometimes it is more mobile and longer, the mobility and elongation are due to wasting, malnutrition and to habitual constipation. As a result, ptosis, volvulus loops, kinks, dolicho-colons, méga-colons large and mobile cæcums, are produced, many mechanical obstacles, which give rise to chronic intestinal stasis

Secondary adhesions, side by side, between the transverse and *ascending and descending colon, are favourable to stasis*

The contents of the large intestine are septic, the slightest manipulations which might soil the fingers and produce rupture into the peritoneum of the fæcal matters, must be avoided, perforating stitches should not be made, the gloves should be changed often, the contaminated surfaces should constantly be washed with ether or iodine, and the intestine be cut with the cautery When coprostasis is necessary the fæcal matters should be pushed far back, and the enterotomy forceps should be placed 10 centimetres from the points to be anastomosed. The sutures should be made at *two or* three levels if the operator possess very fine and firm catgut he can use it, if not he should use linen thread which can form, *no doubt,* a foreign body and produce an abscess but allows of easier suturing

Never use a Murphy's button for anastomosis of the colon to the colon, it can be conveniently used for ileo-colostomies

OPERATIVE INDICATIONS IN CANCER OF THE COLON —The following cases have to be considered

(a) *Patient with Obstruction, Abdomen Distended* —Do not perform laparotomy, for it is possible the eviscerated intestine may be difficult to replace, be content with a cæcal anus under local anæsthesia then perform a month later after radioscopy, be the result negative or positive, an exploratory laparotomy and radical cure

(b) *Very Recent Subacute or Acute Obstruction with Supple Abdomen, not Distended* —Exploratory laparotomy and

1 If there be a cancer of the left colon free it, and dissect it for a long distance (30 or 40 centimetres), divide the meso-colon very far away with the tumour in the centre, and with as many glands as possible suture the two healthy intestines side by side and fix them to the abdominal wall resect the diseased segment Two months later close the artificial anus

2 If there be a cancer of the right colon perform right hemi-colectomy with ileo-colostomy If the patient be weak, only perform ileo-sigmoidostomy and colectomy secondarily

3 If there be a cancer of the sigmoid alone on a short loop do not resect immediately, reduce the intestine close the abdomen and make a cæcal anus A month later resect. If the cancer be on a long loop resect in two stages as for cancer of the left colon.

(c) *If there be no Obstruction* —Every cancer of the colon wherever it is, save cancer of the pelvic part should have the benefit of being treated by total colectomy straight away, for the following reasons more extensive removal of the meso-colon and glands, excision of a segment of the colon, on which a recurrence may occur suppression of the intestinal stasis which often exists in cancer of the colon and which is got rid of by colectomy removal of the intestine which above the tumour at the time of intervention is filled with septic matters inimical to the suture, possibility of a radical cure in one stage with minimal length of convalescence But in current practice total colectomy is not generally performed in one stage. What procedure shall we adopt ?

1 *Cancer of the Right Colon* —Right hemi-colectomy with ileo-colostomy

2 *Cancer of the Left Colon* (*Splenic Flexure, Descending Colon*) — If the subject be thin and the belly supple total colectomy If

these conditions be *not present*, perform the operation in two stages, as indicated above, resection of a large intestinal and meso-colic segment with fixation of the two ends to the abdominal wall, closure of the artificial anus two months later

3 *Cancer of the Pelvic Colon* —It is necessary to distinguish cancer of the upper extremity and of the termination. In the former, resect 5 or 6 centimetres of healthy colon above and below the tumour, remove as much as possible of the meso-colon and make an end to-end anastomosis

If the tumour be at the end of the large intestine, make an abdomino-perineal resection *Abdominal Stage* —Free the meso-colon, tie the inferior mesenteric so as to bring down the descending colon as far as possible, close the abdomen and continue the operation by the perineo-sacral route *Perineal Stage* —Perineo-sacral incision Separate the rectum at the level of the cutaneo-mucous fold of the anus, bring down the distal end, divide it in a healthy part above the tumour open this end at the margin of the anus, the sphincter is to be preserved.

Some Technical Details regarding Right Colectomy for a Tumour.—In cases of right colectomy with peri-colic adhesions we have found the ureter invaded, we had to resect it immediately, and perform nephrectomy at the same time. Once the duodenum was so extensively surrounded by the tumour that it had to be resected, a band only of the intestinal coats being preserved sufficient to ensure evacuation of the ampulla of Vater Immediate gastro-enterostomy gave a successful result

In a cancer of the hepatic flexure we had to excise an enormous mass of the pancreas, we covered it with mesentery but the pancreatic juice drained into the wound and the patient died on the twelfth day Sir Arbuthnot Lane rejects right hemi-colectomy, preferring in all cases complete colectomy This operation is certainly more radical especially in cases of cancer of the right colon, but if the patient be in a weak state of health if he be fat and the abdomen distended, right hemi-colectomy is less mutilating and consequently milder we prefer it in the majority of cases Lane objects to it for the following reason in every cancer of the ascending colon intestinal stasis is present, which may be associated with a splenic and a lumbo-iliac kink. Below the suture of the ileum to the transverse colon there are, therefore, two kinks, behind which the fæcal matters collect and this will increase the intra intestinal tension and can cause the suture to give way A simple means of

avoiding this dire disaster after the anastomosis is finished is to divide the ligament at the splenic and at the colo-sigmoid flexure, the division of these two sero-fibrinous bands only requires a few moments and ensures a free evacuation of the bowel

SOME TECHNICAL DETAILS IN COLECTOMY FOR CANCER OF THE TRANSVERSE COLON —This cancer can be operated upon as any cancer of the colon by complete colectomy, but if, as I have said above, the patient be fat with slight resistance, and with a distended abdomen, it is preferable to make a segmentary resection, then, according to the presence or absence of obstruction an end to-end suture should be made immediately, or an anastomosis of the two intestinal ends to the abdominal wall. Whichever it be, in order to perform colectomy of the transverse colon, there are two details which must be observed

1 Dissect the colon from the omentum in the neighbourhood of the splenic and hepatic flexures divide with a knife the attachments of the right and left colic flexures in such a way as to bring up easily the ascending and descending colons, so that there is no traction on the suture of the colon

2 Having separated the colon and epiploon, the two extremities of the transverse colon are easily brought together, the stomach is separated from the colon, not by section of the gastro-colic omentum, or by freeing the colon from the omentum but by stripping as performed in gastrectomy for ulcer The suppression of the right and left gastro-epiploic arteries does not affect the nutrition of the stomach, which is sufficiently supplied by the coronary artery

SOME DETAILS RELATING TO LEFT COLECTOMY —1 The incision of the abdominal wall should be long and in the middle line in ordinary cases but transverse when the tumour is adherent to the abdominal wall. It is besides, necessary to reach the cancerous segment in a direct manner, in order to liberate it and dissect it. Sometimes the operator commences by a vertical incision and afterwards makes a transverse one perpendicular to the first (incision in L)

2 *Liberation of the Tumour* —Never attack the tumour directly, especially if it occupy the splenic flexure or if it be fixed to the abdominal wall but first free the left colon from the abdominal wall and from the omentum, this should be done as far as possible from the tumour in order to deal with this latter alone afterwards Finally by degrees, and lastly, free the tumour The hæmorrhagic oozing which results from the separation of the colon is practically nil. In order to free the splenic flexure without hæmorrhage, it is a

good thing to press it back with the tumour by means of a *compress*, without using knife or scissors, which ought to be used only for cutting the attachments, divide the left phrenico-colic ligament. Be careful not to use the compress or the finger at the part where the spleen is adherent

If the tumour adhere to the spleen, separate it with the knife only, without cutting the tissue of the spleen, so as not to make the organ bleed. When the spleen has been carefully *freed, then only* use the compress, to liberate the colon. If the spleen be injured, remove it without wasting time to stop the bleeding the necessary *manipulations being often* dangerous and unfruitful.

If the tumour be adherent to the uterine vessels, they must be tied and cut

The left ureter must be examined, and freed In the majority of cases *it is easy to separate it from the tumour,* but *if it* be *invaded* by the neoplasm it must be resected between two ligatures. After simple division its continuity can be established, or it can be implanted into the bladder But after an extensive resection its two ends must be well tied The kidney atrophies If the left kidney be adherent to the cancer perform nephrectomy The tumour often adheres to the abdominal wall. Resect the parietal *peritoneum with the adherent tumour* Neoplastic and parietal tissues are to be drawn into the operation wound *en bloc* The mass is exteriorised on to a bed of compresses the vessels freed and the meso-colon divided on the distal side of the glands but remember the lymphatic supply of this part is poor The patient dies of glandular metastasis in only about 40 per cent of cases, death is generally caused by intestinal obstruction before the glands are invaded The *majority* of the glands are inflammatory

Adhesions to the Ileum —If a loop of the ileum be included in the tumour resection is necessary, perform end to-end anastomosis with linen thread at two levels

Adhesions to the Bladder —Resect the visceral wall and close it at two levels, peritoneal and muscular do not penetrate *the vesical* mucosa fix in a catheter

INTESTINAL ANASTOMOSES AFTER RESECTION OF THE COLON —On principle, the best operation for cancer of the colon, wherever its site save in the ileo-pelvic colon, is complete colectomy, in preference to partial colectomy for the *following reasons*

1 Because removal at once of the whole large intestine improves the immediate prognosis and assures firmness *of the intestinal*

suture The removal of the large intestine, moreover, prevents infection of or injury to the anastomoses from the fæcal matters above it

2 Complete colectomy allows of a more extensive removal of the glands than any segmentary resection

3 It sometimes happens, recurrence takes place in another part of the large intestine, if this latter be removed *in toto*, this recurrence cannot take place

4 The great majority of patients affected with cancer of the colon have long suffered from constipation and intestinal stasis, and unknowingly from chronic stercoræmia By removal of the large intestine, not only is the cancer cured, but also the stasis

Segmentary colectomy often necessitates two or three operations with painful intervals from the artificial anus, or from stercoral fistulæ Complete colectomy if it be possible, frees the patient at once from all ennui with a minimal period of convalescence.

5 This large operation allows an end to-end ileo-sigmoid anastomosis, which is firmer, easier, and more certain than any resection of colon followed by an end to-end colo-colic or by a side to-side anastomosis

In practice, however, we more often perform a partial colectomy, right hemicolectomy, if we have to deal with cancer of the right colon, segmentary resection in two stages—*i e*, resection of the cancerous segment followed by anastomosis of the two ends to the skin, and secondarily closure of the anus in cancers of the left colon Complete colectomy is only indicated in thin patients whose powers of resistance are still good, and with a supple abdomen (one in four)

To sum up complete colectomy or right hemicolectomy should be performed for every cancer of the right colon, segmentary resection in two stages or complete colectomy for every cancer of the left colon. Cancer of the ileum should be treated by segmentary resection with end to-end anastomosis, by suture (long loop), or by invagination of the upper into the lower end, the first being placed over a rubber tube (short loop)

The future results are good, for there are three good cancers—those of the uterus of the labia and of the large intestine. These tumours are often cured by a well planned and executed operation

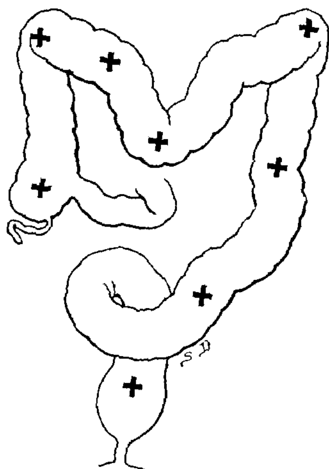


FIG 170 — CANCER OF THE I[NTESTINE]

The crosses indicate the comm[on] sites of cancer cæcum h[epatic] flexure right extremity of transverse colon middle of transverse colon splenic fle[xure] descending colon and rectal [am]pulla The three first ca[n be] grouped under the name of ca[ncers] of the right colon those of splenic flexure and of the desc[end]ing colon can be considered cancers of the left colon

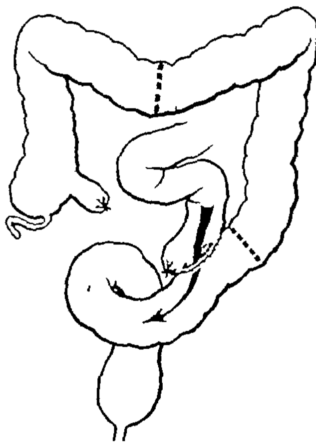


FIG 171 — CANCER OF THE RI[GHT] COLON

Intervention in two stages At t[he] first stage the operator divides t[he] ileum some centimetres from t[he] cæcum and the side side ileo-s[ig]moidostomy this is not so go[od] as end side implantation, but advisable in stout patients a[nd] when the operator is not skilled [in] intestinal implantations the tec[h]nique of which is more difficult.

The two dotted lines on the colon in[di]cate where the secondary section should be carried out some month[s] later The dotted line on th[e] transverse colon corresponds wit[h] right hemi colectomy the dotte[d] line immediately above the anasto[mo]sis to complete colectomy Th[e] latter although apparently too radical, is indicated in favourable cases of cancer of the right colon. Right hemi colectomy should be recommended if the patient be not strong or if he be stout; if he be thin, on the other hand, if the operation be easy and the belly supple the patient being still strong complete colectomy is better

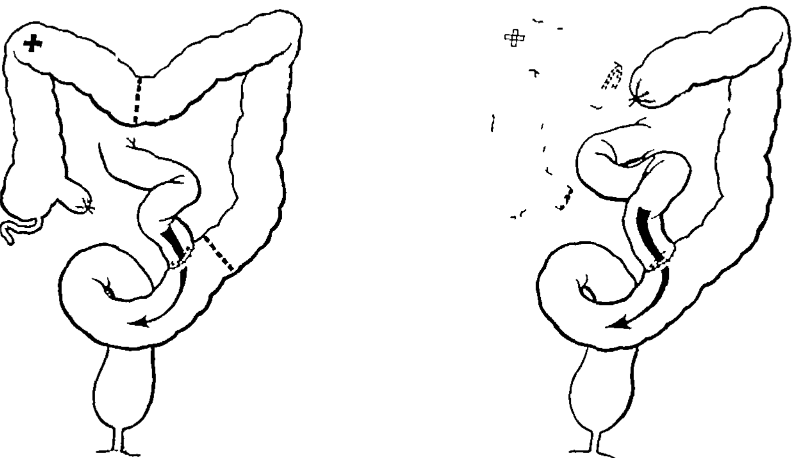


FIG 172.—CANCER OF THE *RIGHT COLON*

Colectomy in two stages. The cross indicates the site of the cancer (hepatic flexure). The first stage has consisted in an end-side implantation (the better). The dotted line indicates the point where secondary division is to be performed some *months* later at the time of the colectomy. The line immediately above the ileo-sigmoidostomy corresponds to a complete colectomy. This latter is the operation of choice if the cancer affect the left colon

FIG 173.—CANCER OF THE HEPATIC FLEXURE (RIGHT COLON)

Operation in one stage. The operator has removed the right colon, closed the transverse in a cul-de-sac and performed an ileo-sigmoidostomy by implantation.

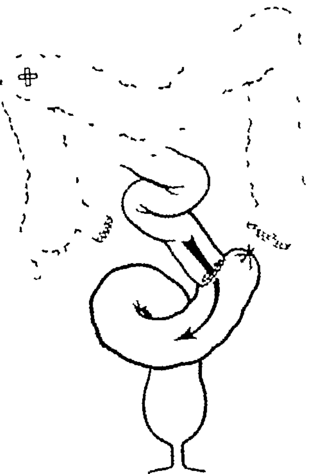


FIG 174.—CANCER OF THE RIGHT COLON

Complete colectomy in two stages At the first stage the operator has performed an ileo sigmoidostomy by implantation; at the second he has removed the whole colon up to the anastomosis. Operation of choice.

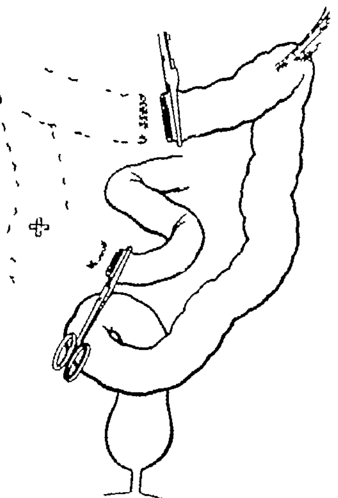


FIG 175.—CANCER OF THE RIGHT COLON (Quénu).

Right hemi-colectomy in one stage. The portion in dotted lines is the part to be removed

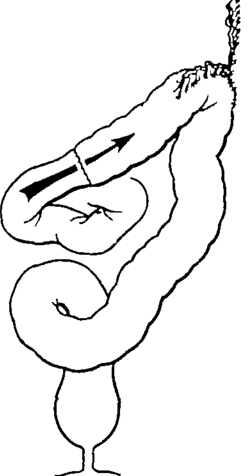


Fig 176.—Cancer of the Right Colon

Right hemi-colectomy in one stage. End-to-end anastomosis (ileo-transversostomy) The splenic flexure has been *liberated* so as to *get rid* of the flexure and to give more freedom to the left segment of the transverse colon Generally the operator ought to liberate the splenic flexure up to the descending colon Anastomosis is more easy *More than that removal of the splenic flexure gets rid of an* important cause of intestinal stasis.

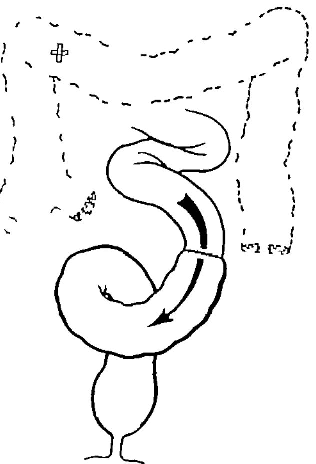


Fig 177.—Cancer of the Right Colon

Complete colectomy in one stage The advantage of this colectomy is to remove all the septic and toxic materials which jeopardise an anastomosis of the colon to the colon All the more as intestinal kinks are generally situated at the splenic flexure complete colectomy assures better intestinal drainage afterwards

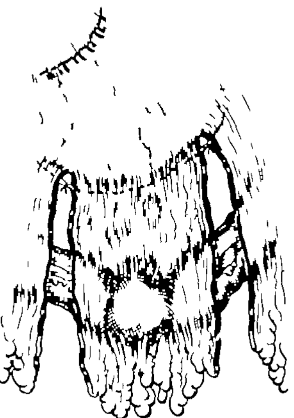


FIG 178 — CANCER OF THE TRANSVERSE COLON

Segmentary resection For this cancer the ideal treatment is complete *colectomy* but if the patient s powers of resistance be poor and if he be stout the operator should be satisfied with a segmentary resection in one or two stages as follows:

Stripping the omentum from the right and left segments of the transverse colon This completely isolates the right and left segments of the transverse colon The middle segment here diseased remains *adherent to the large omentum* and both *must be removed* close to the greater curvature of the stomach Ligature of the gastro-epiploic arteries.

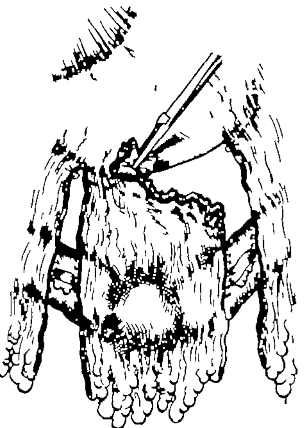


FIG 179 — CANCER OF THE TRANSVERSE COLON

Segmentary resection Stripping the great curvature of the stomach by the compress This stripping which Témoin has advised for gastrectomy allows, in cases of cancer of removal of the large omentum in contact with the diseased segment.

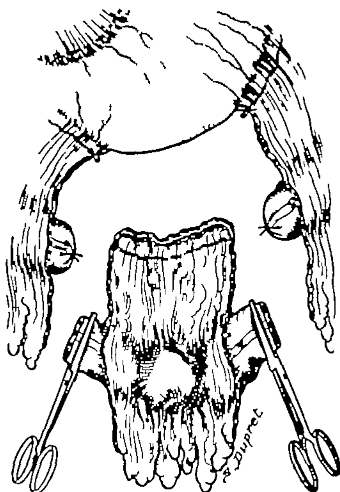


FIG 180.—CANCER OF THE TRANSVERSE COLON

The colon has been divided by the thermo-cautery; its two extremities are closed in a cul-de-sac The great curvature of the stomach stripped of the great omentum remains sufficiently nourished we have never observed any ischæmia of the stomach

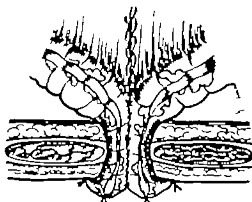


FIG 181 —CANCER OF THE TRANSVERSE COLON

Segmentary colectomy in two stages The two culs-de-sac of the colon have been attached to the skin; if obstruction be present the thread at the proximal end is removed immediately if, on the other hand, there be no obstruction, the operator waits forty eight hours, and applies a cautery to the cul-de-sac of the proximal end. The distal end will ultimately open of itself The two segments of the colon have been united side by side, which will facilitate closure of the transverse colon some months later

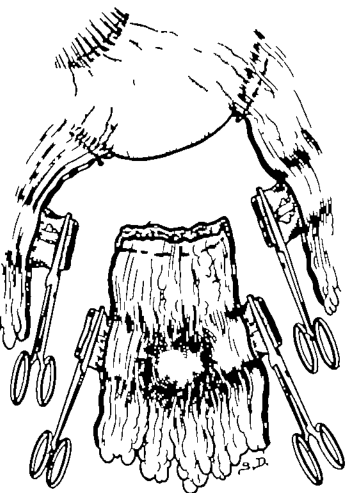


FIG 182.—CANCER OF THE TRANSVERSE COLON

Segmentary resection in one stage. The colon has been divided by the thermo cautery as far as possible from the tumour; the two extremities will be brought into contact and sutured. In cases where there is risk of traction on the suture, the operator ought to divide the attachments of the splenic flexure and free it.

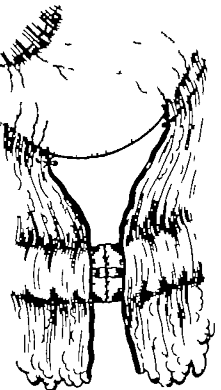


FIG 183.—CANCER OF THE TRANSVERSE COLON

Segmentary resection in one stage. Instead of opening the two ends of the transverse colon on to the abdominal wall, the operator anastomoses them end to end; this is only attempted if there be no stasis of the right colon, or if previously a cæcal anus has been made for acute obstruction This suture of the colon is fragile, even in favourable cases; it is a good thing to fix it near the wound in the skin. A stercoral fistula often results, but it closes of itself

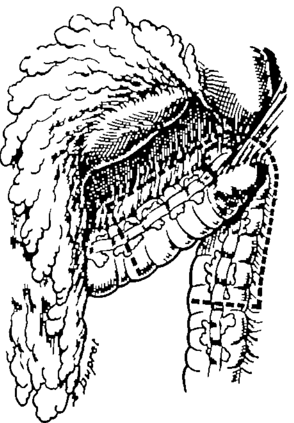


FIG 184 —CANCER OF THE SPLENIC FLEXURE.

Segmentary resection with temporary anus. Line of section for removal of the splenic flexure.

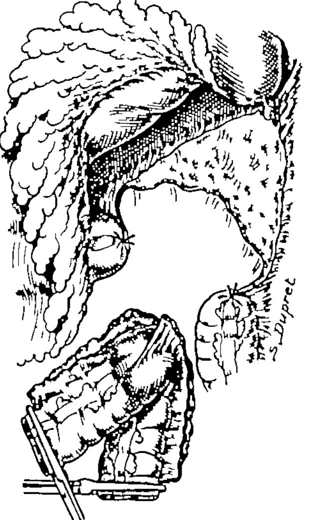


FIG 185 —CANCER OF THE SPLENIC FLEXURE

Segmentary resection with temporary anus The operator has removed the splenic flexure and closed in a cul de sac the two extremities of the healthy colon

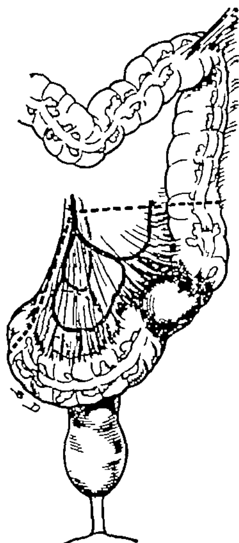


FIG 188.—CANCER OF THE SIGMOID RESECTION IN ONE STAGE.

The dotted line indicates the portion of the intestine which must be removed.

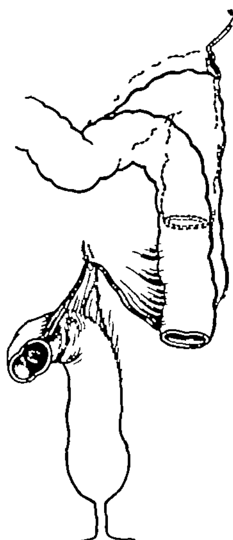


FIG 189.—CANCER OF THE SIGMOID. RESECTION IN ONE STAGE.

Resection of the sigmoid has been performed. The operator has divided the phreno-splenic ligament and separated the left colon from the parietal peritoneum so as to bring down the descending colon and make end to-end anastomosis easy

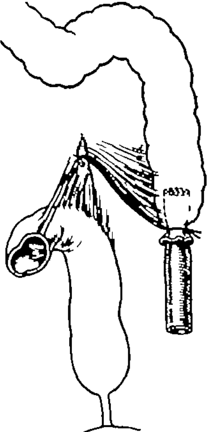


Fig 190.—Cancer of the Sigmoid Resection in One Stage.

End to-end anastomosis by suture is the ideal method The operator then finishes the operation by the insertion into the anus of a Faucher's tube, which passes beyond the anastomosis and allows of removal of flatus externally If the end to-end anastomosis be performed on the floor of the pelvis, the operation is a delicate one, especially if the patient be fat The procedure in the opposite figure is easier and more rapid, but less elegant. The operator introduces a non perforated drain into the descending colon and fixes it by a linen ligature

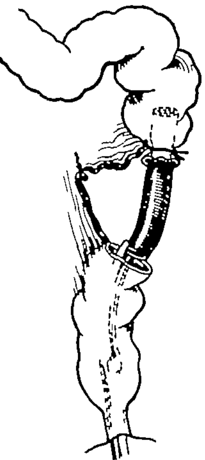


Fig 191 —Cancer of the Sigmoid Resection in One Stage.

An assistant introduces a clamp into the anus and draws down the tube with the descending colon.

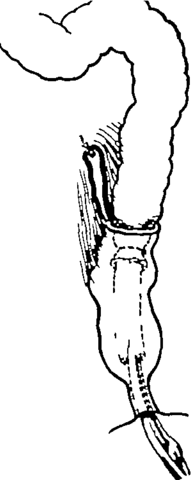


Fig 192 —Cancer of the Sigmoid Resection in One Stage.

The intestine and its mesentery pass into the sigmoid and the rectum

Fig 103.—Cancer of the Sigmoid Resection in One Stage.

The operator has introduced a sero-serous suture between the two segments of the colon The intestinal border which corresponds to the insertion of the meso-colon will be fixed by some interrupted stitches.

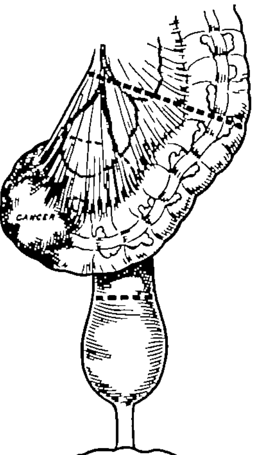
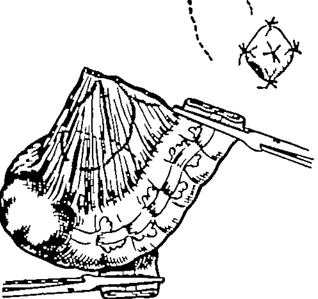


Fig 104—Cancer of the Sigmoid low down Complete Colectomy in Three Stages.*

First stage: Resection of the sigmoid at Douglas pouch



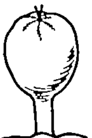
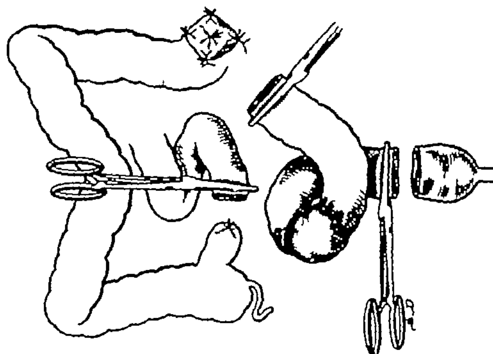
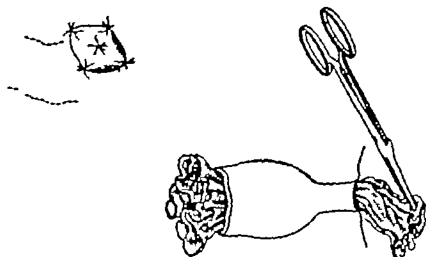


Fig 105—Resection of the Sigmoid low down Complete Colectomy in Three Stages

First stage: The descending colon could not be brought down; more than that, the recto-sigmoidal end was too short; the operator was therefore compelled to anastomose the end of the descending colon to the wall (temporary anus). The sigmoid was closed by a purse-string suture

* The case which has served as a model for Figs. 194 201 was shown at the Academy of Medicine two years after the operation. This operation was performed with Dr Gustave Bernard.





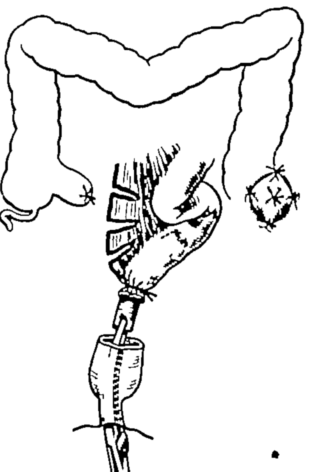


Fig 108.—Cancer of the Sigmoid low down Complete Colectomy in Three Stages.

The ileum was brought down to the anus. The operator cut into the omentum with scissors to make the descent easier; a tube was introduced into the ileum; the visible part of the ligature is at the anus.

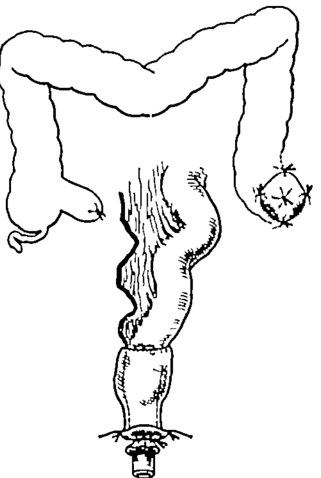


Fig 109.—Cancer of the Sigmoid low down Complete Colectomy in Three Stages

Second stage: Some stitches fixed the ileum round the anus. The operator fixed the ileum to the rectum and also close to Douglas pouch by the abdominal wound The colon was excluded and opened at the left iliac anus, where the contents were discharged.

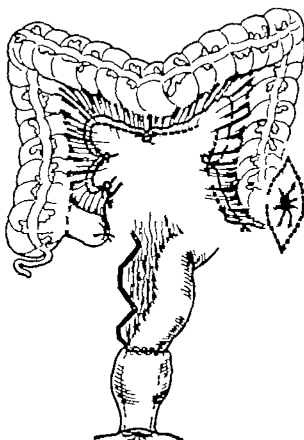


FIG 200 —CANCER OF THE SIGMOID LOW DOWN COMPLETE COLECTOMY IN THREE STAGES.
Third stage (the easiest): Resection of the segment of the colon.

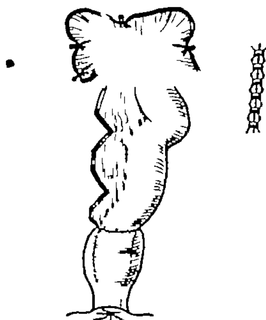


FIG 201 —CANCER OF THE SIGMOID LOW DOWN COMPLETE COLECTOMY IN THREE STAGES.
Third stage Appearance of the viscera after operation. Ligature of the meso-colic vessels. Fixation of the ileum to the anus Closure of the left abdominal wound (clips).

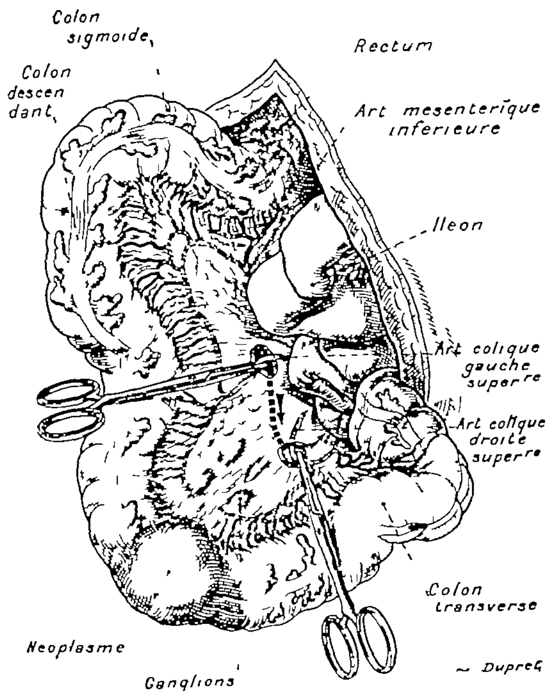


FIG 202.—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

The first stage of the operation has been performed as for every complete colectomy (mobilisation of the colon, dissection of the omentum from the colon, then bilateral separation of the colon from the parietal peritoneum). The colon, as an ileum, is entirely free The operator begins the division of the meso-colon at the point corresponding to the diseased part of the bowel as far away from it as he can, and as near as possible to the vertebral column, so as to remove as many of the glands as possible.

Côlon sigmoïde = Sigmoid colon. *Rectum* = Rectum. *Côlon descendant* = Descending colon. *Art mésentérique inférieure* = Inferior mesenteric artery *Iléon* = Ileum. *Art colique gauche s pérre.* = Left superior colic artery *Art colique droite supérre* = Right superior colic artery *Néoplasme* = Growth. *Côlon transverse* = Transverse colon. *Ganglions* = Glands.

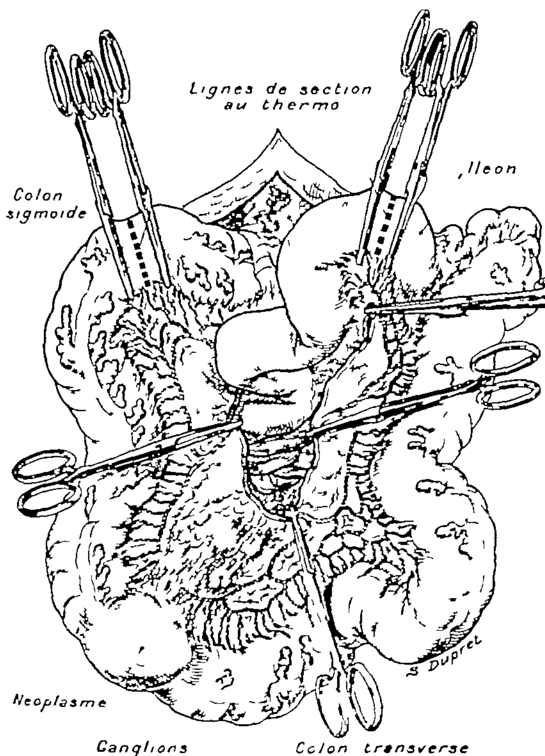


FIG 204.—CANCER OF THE LEFT TRANSVERSE COLON. COMPLETE COLECTOMY

Division of the ileum a few centimetres from the cæcum, where it appears well vascularised. Division of the sigmoid at a point most convenient for end-to-end anastomosis.

Lignes de section au thermo = Lines of section by the thermo-cautery. *Côlon sigmoïde* = Sigmoid colon. *Iléon* = Ileum. *Néoplasme* = Growth. *Ganglions* = Glands. *Côlon transverse* = Transverse colon.

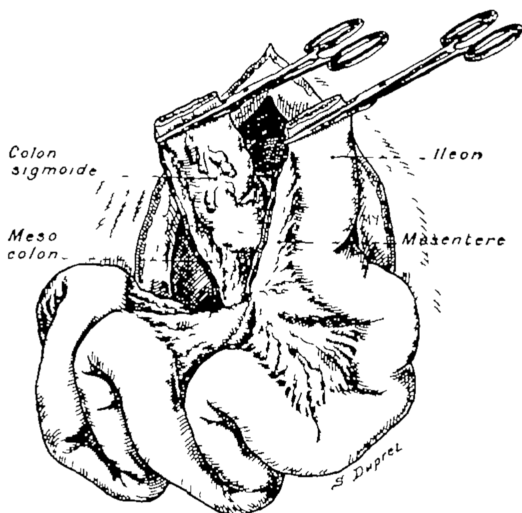


FIG 205 —CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

The iliac and sigmoidal ends are turned in such a way that the two mesenteric and meso-colic edges correspond exactly In this way end to-end anastomosis will not produce torsion of the ileum, an accident which easily occurs.

Côlon sigmoïde—Sigmoid colon *Iléon*—Ileum. *Méso-côlon*—Meso-colon. *Mésentère*—Mesentery

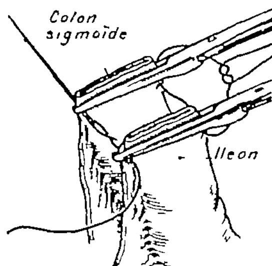


Fig 206.—Cancer of the Left Transverse Colon Complete Colectomy

How to prepare by two fixation threads the end to-end suture even if the colon and the ileum be unequal in diameter

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum

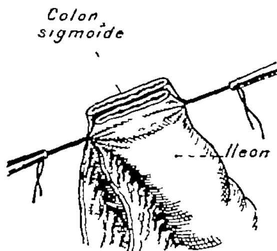


Fig 207.—Cancer of the Left Transverse Colon Complete Colectomy

The two pairs of forceps stretch the two threads; the crushing forceps have been removed if the intestine be empty enterotomy forceps are unnecessary

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum.

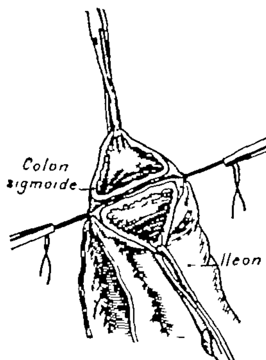


Fig 208.—Cancer of the Left Transverse Colon Complete Colectomy

Chaput s forceps are applied to the middle of each external intestinal edge

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum.

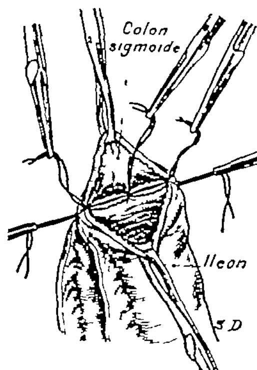


Fig 209.—Cancer of the Left Transverse Colon Complete Colectomy

Three fixation sutures applied to the posterior edge

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum.

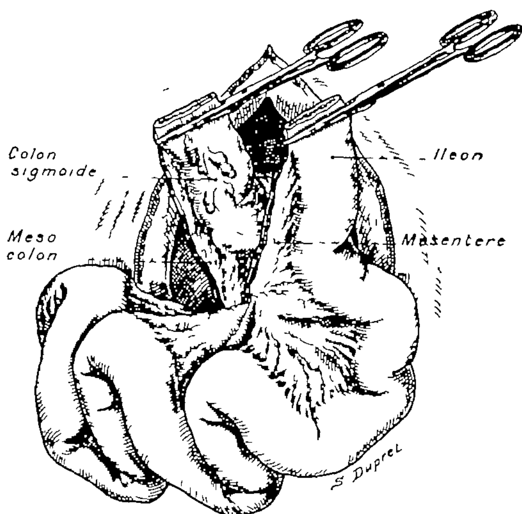


FIG 205 —CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

The iliac and sigmoidal ends are turned in such a way that the two mesenteric and meso-colic edges correspond exactly In this way end to-end anastomosis will not produce torsion of the ileum, an accident which easily occurs.

Côlon sigmoïde—Sigmoid colon. *Iléon*—Ileum. *Méso-côlon*—Meso-colon. *Mésentère*—Mesentery

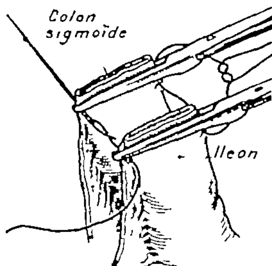


FIG 206.—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

How to prepare by two fixation threads the end to-end suture even if the colon and the ileum be unequal in diameter

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum

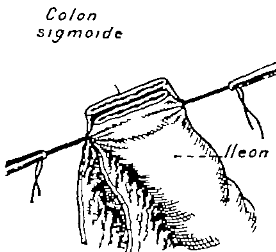


FIG 207—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

The two pairs of forceps stretch the two threads; the crushing forceps have been removed if the intestine be empty enterotomy forceps are unnecessary

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum.

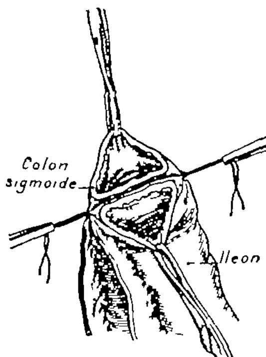


FIG 208.—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Châput s forceps are applied to the middle of each external intestinal edge

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum.

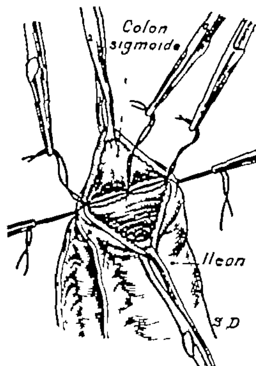


FIG 209—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Three fixation sutures applied to the posterior edge.

Côlon sigmoïde=Sigmoid colon.
Iléon=Ileum.

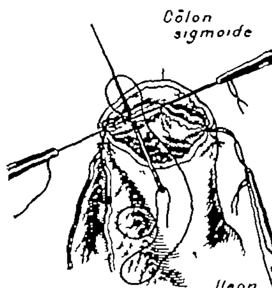


FIG 210—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Button hole stitches of linen thread on the posterior edge. Note the rôle of the fixation threads which stretch the edge and bring it into accurate apposition.

Cōlon sigmoïde = Sigmoid colon.
Iléon = Ileum.

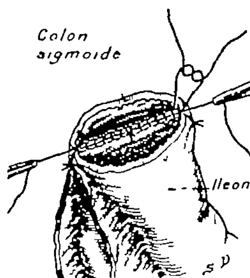


FIG 211—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Finish of the posterior continuous through-and through suture

Cōlon sigmoïde = Sigmoid colon.
Iléon = Ileum.

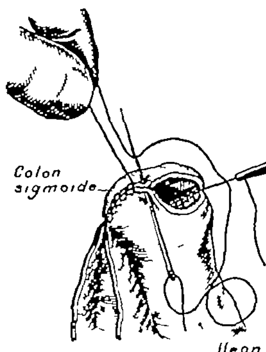


FIG 212—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

rior through-and through button hole suture.

Cōlon sigmoïde = Sigmoid colon.
Iléon = Ileum.

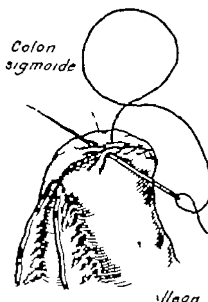


FIG 213—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Anterior continuous suture of the serous surfaces, which will be continued on to the two surfaces of the intestine

Cōlon sigmoïde = Sigmoid colon.
Iléon = Ileum.

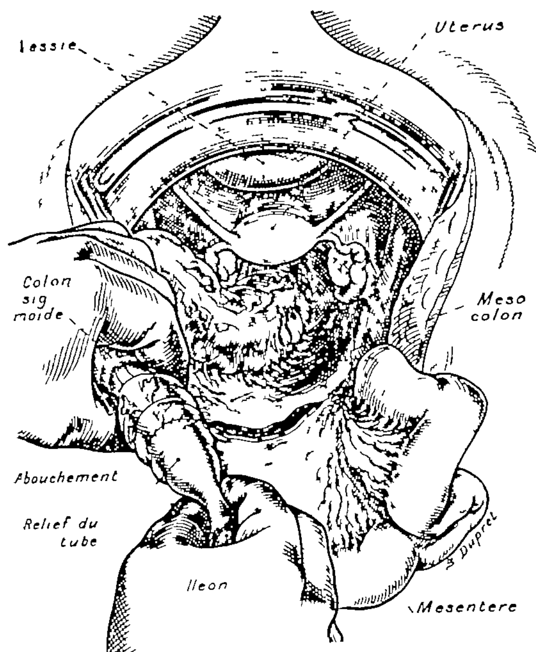


FIG 214 —CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Introduction of Faucher's tube into the ileo-sigmoid anastomosis, as after every complete colectomy

Vessie = Bladder *Utérus* = Uterus. *Côlon sigmoïde* = Sigmoid colon. *Méso-côlon* = Meso-colon. *Abouchement* = Anastomosis. *Relief du tube* = Outline of the tube. *Iléon* = Ileum *Mésentère* = Mesentery

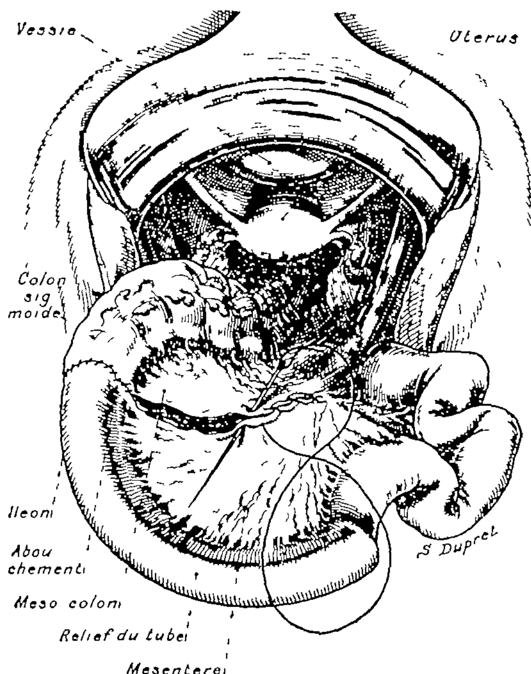


FIG 215 — CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Apposition of the meso-sigmoid and of the mesentery with linen thread

Vessie = Bladder *Utérus* = Uterus. *Côlon sigmoïde* = Sigmoid colon. *Iléon* = Ileum. *Abouchement* = Anastomosis. *Méso-côlon* = Meso-colon. *Relief du tube* = Outline of the tube. *Mésentère* = Mesentery

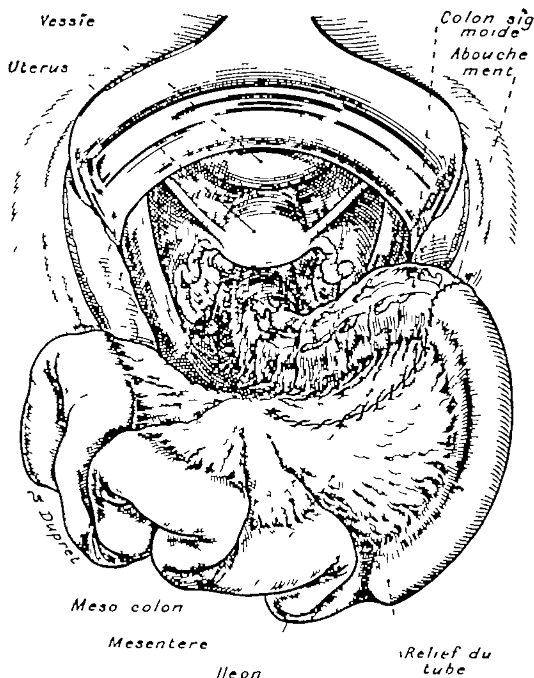


FIG 216.—CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Appearance of the operation when finished. Note the rubber tube, which ought to remain in place for six days.

Vessie = Bladder *Côlon sigmoïde* = Sigmoid colon. *Utérus* = Uterus. *Abouchement* = Anastomosis. *Méso-côlon* = Meso-colon. *Mésentère* = Mesentery *Iléon* = Ileum. *Relief du tube* = Outline of the tube.

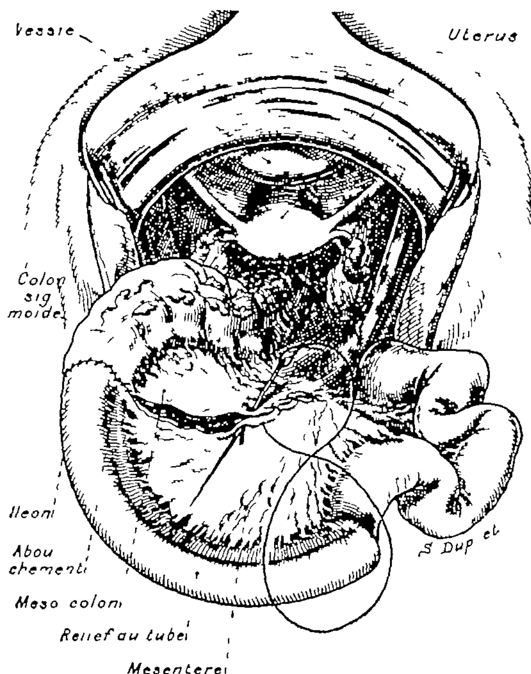


FIG 215 —CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

Apposition of the meso-sigmoid and of the mesentery with linen thread

Vessie—Bladder *Utérus*—Uterus *Côlon sigmoïde*—Sigmoid colon. *Iléon*—Ileum *Abouchement*—Anastomosis. *Méso-côlon*—Meso-colon *Relief du tube*—Outline of the tube. *Mésentère*—Mesentery

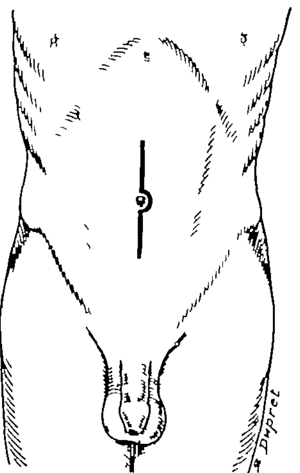


FIG 218.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION* SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Median laparotomy The operator has not diagnosed the site of the lesion because of moderate distension He has been content with a median incision above and below the umbilicus. In cases of considerable distension less would have been done—viz. a cæcal anus

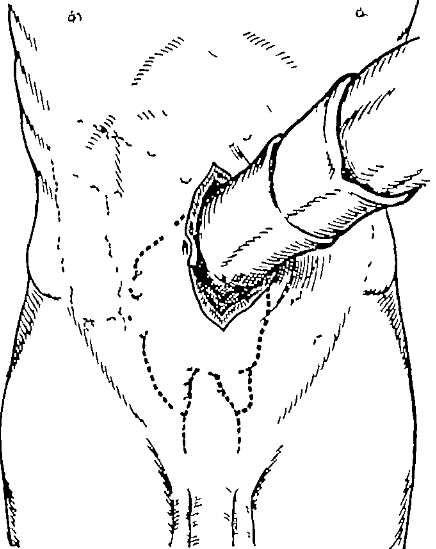


FIG 219.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS FIRST STAGE.

The operator palpates successively each portion of the large intestine He begins with the sigmoid and the upper part of the rectum; rectal examination before the operation was negative



FIG 217 —CANCER OF THE LEFT TRANSVERSE COLON COMPLETE COLECTOMY

The piece removed in the operation just described, and which served as a model for the drawings. The glands seen were purely inflammatory The patient got up thirteen days after the operation.

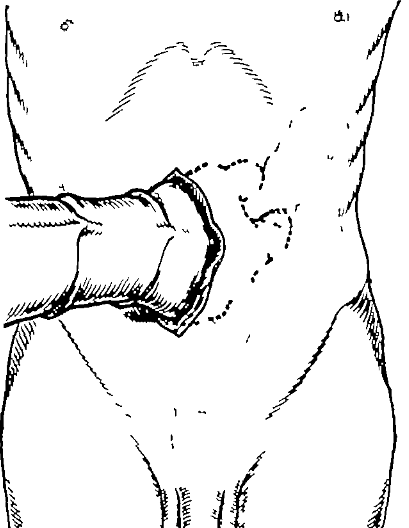


Fig 222.—Cancer of the Splenic Flexure. Intestinal Obstruction. Segmentary Resection followed by a Temporary Anus. First Stage.

Exploration of the left transverse colon.

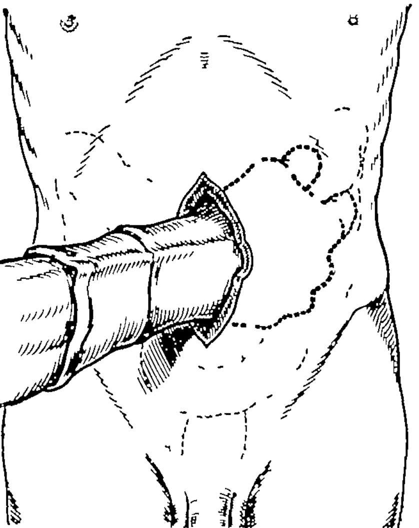


Fig 223.—Cancer of the Splenic Flexure. Intestinal Obstruction. Segmentary Resection followed by a Temporary Anus. First Stage.

The operator explores the splenic flexure and the descending colon

Fig 220 —Cancer of the Splenic Flexure. Intestinal Ob- struction Segmentary Resection followed by a Tem- First Stage.

ascending colon after the

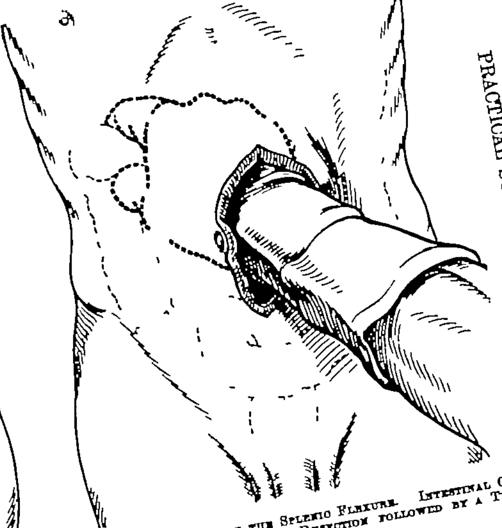


Fig. 221 —Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus. First Stage.

The operator continues the exploration with the right transverse colon

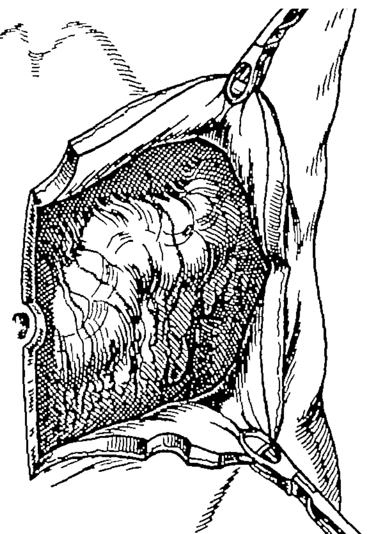


FIG 226.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

The tissue forceps have opened out the transverse lips of the wound Exposure of the splenic flexure of the colon and of the neighbouring organs.

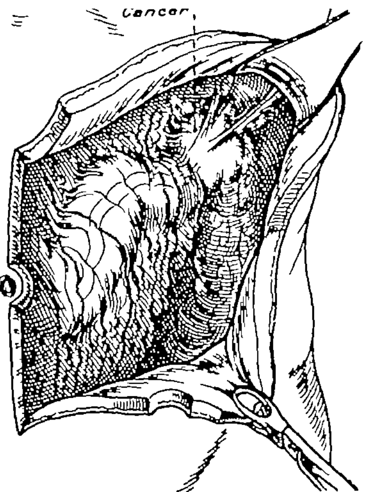


FIG. 227.—CANCER OF THE SPLENIC FLEXURE INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE

A vaginal retractor exposes the splenic flexure and shows its connections with the spleen Liberation of the spleen must be made with care to avoid tearing The operator ought to find out whether the adhesions are inflammatory or neoplastic If they be inflammatory the knife and the scissors will separate them easily from the spleen without tearing the latter.

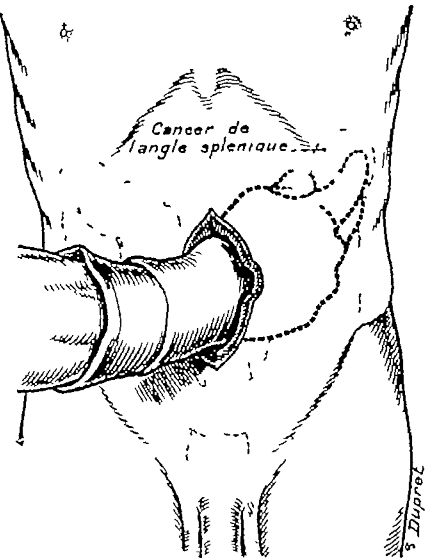


FIG. 224.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

The hand perceives the cancerous mass in the splenic flexure. It examines its mobility and the possibilities of exeresis. If removal were not possible the operator would be content with a cæcal anus or with an ileo-sigmoidostomy

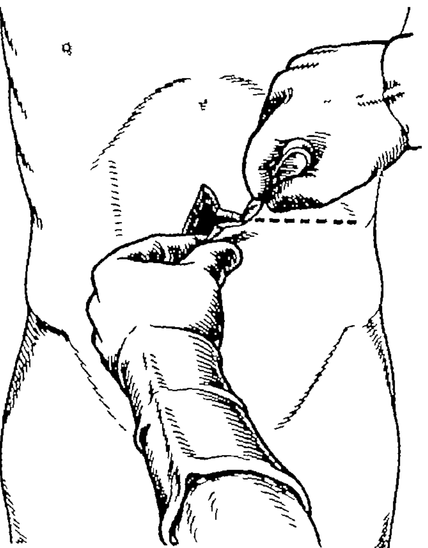


FIG 225.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS FIRST STAGE.

The operator makes a transverse incision from the vertical one in order to attack the splenic flexure of the colon.

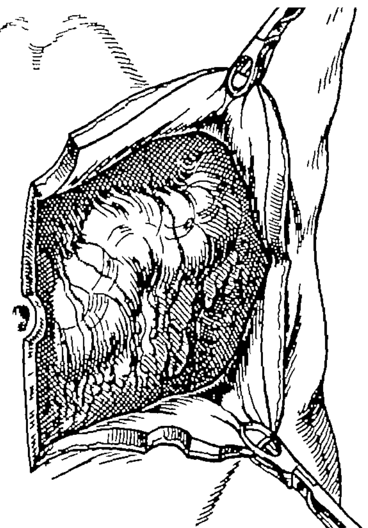


Fig 226.—Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus. First Stage.

The tissue forceps have opened out the transverse lips of the wound Exposure of the splenic flexure of the colon and

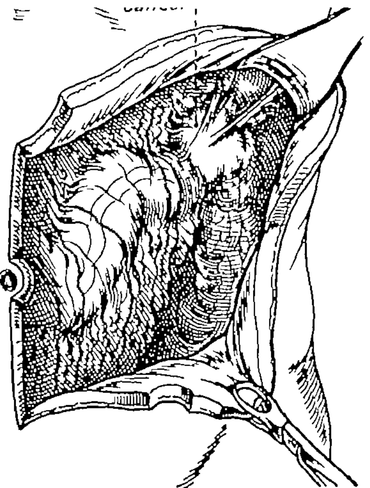


Fig 227.—Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus. First Stage.

A vaginal retractor exposes the splenic flexure and shows its connections with the spleen. Liberation of the spleen must be made with care to avoid tearing The operator ought to find out whether the adhesions are inflammatory or neoplastic. If they be inflammatory the knife and the scissors will separate them easily from the spleen without



FIG 228.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

The operator avoids touching the splenic flexure where he will finish its separation. He attacks the descending colon first, and separates the left colon from the parietal peritoneum In the present case the division of the colon from the parietal peritoneum was made too near the wall of the abdomen. It is better to divide the peritoneum near the intestine, to leave more serous surface and to appose easily the peritoneum to the abdominal wall.

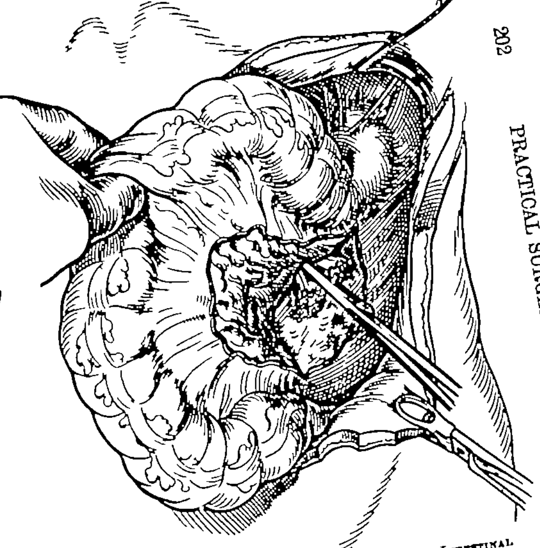


FIG 229.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Separation of the colon from the peritoneum is continued by a compress mounted on forceps.



FIG 230 —CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Separation of the colon from the peritoneum being finished the operator strips the omentum from the colon beginning in the middle of the transverse colon and following it up to the splenic flexure; the colon is held only by this flexure



FIG 231 —CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

The operator separates the transverse colon as far as the splenic flexure. When the separation of the descending colon is finished the colon is only held by the splenic flexure

Cancer = Cancer

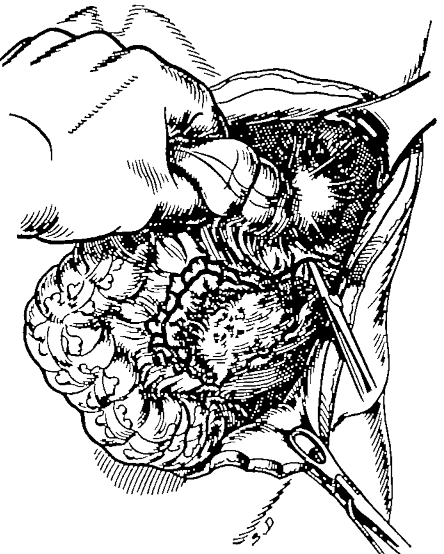


Fig 232.—Cancer of the Splenic Flexure. Intestinal Obstruction. Segmentary Resection followed by a Temporary Anus. First Stage.

Before freeing the splenic flexure the operator completes the dissection of the left colon from the parietal peritoneum.

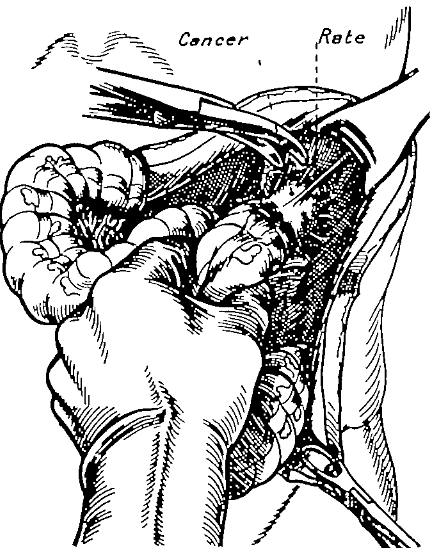


Fig 233.—Cancer of the Splenic Flexure. Intestinal Obstruction. Segmentary Resection followed by a Temporary Anus. First Stage.

Freeing the splenic flexure: some fibrous bands join the splenic flexure to the spleen, which should not be freed with the finger or by the compress, for if the spleen be injured it bleeds and this hemorrhage may be fatal. The operator should see what he is doing and cut the adhesions with a knife or by scissors. The fact that the transverse and descending colons are first freed before attacking the splenic flexure simplifies this stage.

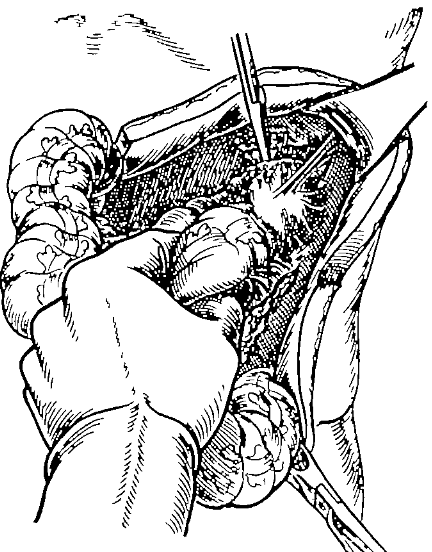


Fig 234.—Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus First Stage.

Freeing the splenic flexure When the operator has divided with the knife and scissors the cicatricial tissue the liberation can be completed with the compress; this will not exercise any action on the spleen but on the abdominal wall

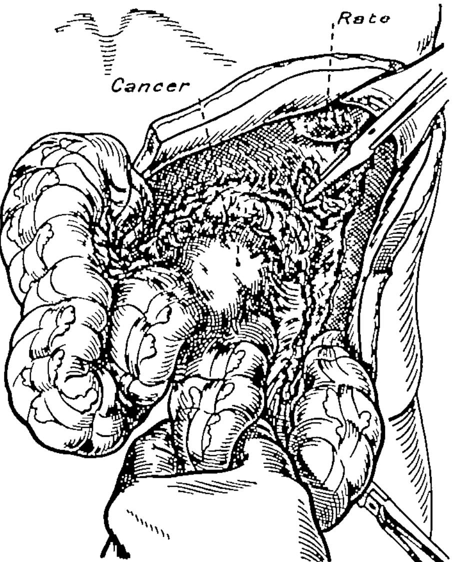


Fig 235.—Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus. First Stage.

The spleen has been entirely separated by the knife and scissors The remainder of the dissection is made by the compress.

Cancer = Cancer *Rate* = Spleen.

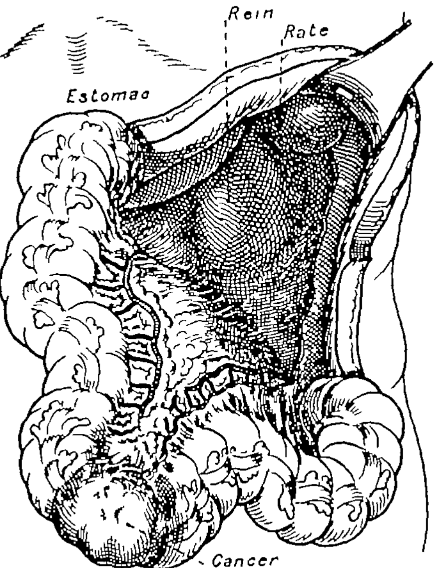


FIG 236.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Appearance of the left lumbar cavity after freeing the splenic flexure Liberation of the colon ought to be extensive

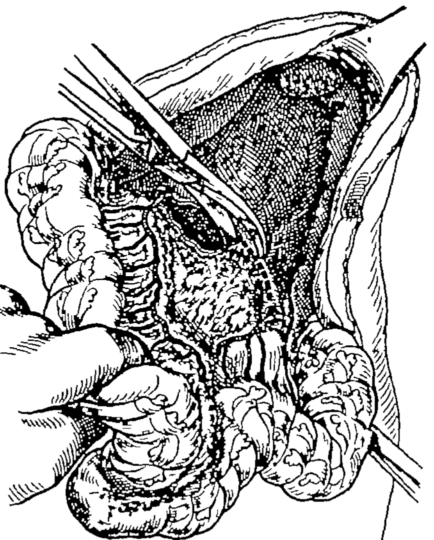


FIG 237.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Division of the meso-colon Ligature of the vessels Note the glands which will be removed with the segment of the colon.

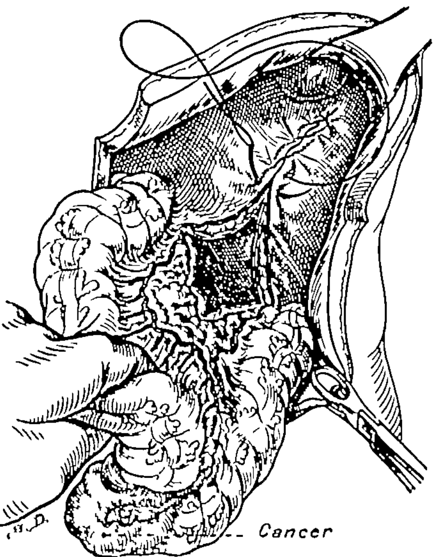


FIG 229.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Restoring the raw surface of the meso-colon.

Cancer = Cancer

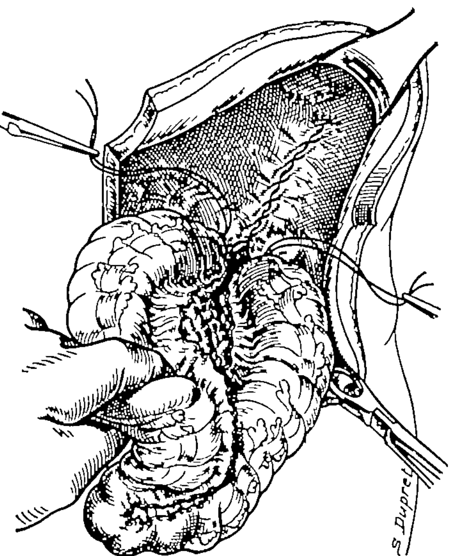


FIG 230.—CANCER OF THE SPLENIC FLEXURE INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

Ligature of the two ends of the colon which will be cut by the cautery

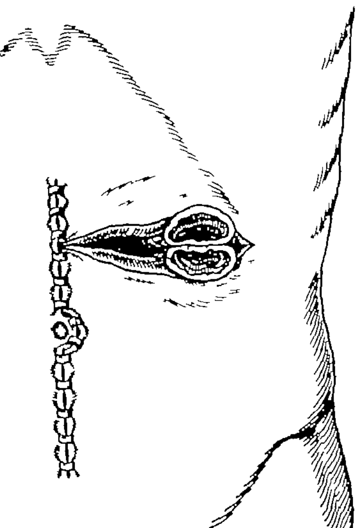


FIG 243.—CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

The median wound is closed The two ends of the colon are brought into the left angle of the transverse wound of the abdomen, where they will be fixed by some stitches.

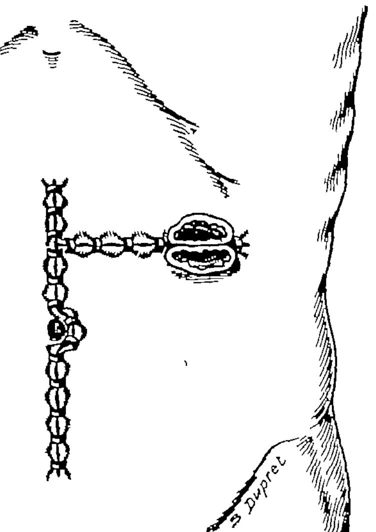


FIG 244 —CANCER OF THE SPLENIC FLEXURE. INTESTINAL OBSTRUCTION SEGMENTARY RESECTION FOLLOWED BY A TEMPORARY ANUS. FIRST STAGE.

View of the abdominal wall. Clips on the skin It is a good thing to introduce a Paul's tube *into the proximal end of the colon* In this patient the terminal end which was well provided with tissue, *allowed of a very easy end to-end anastomosis two months after*wards with immediate union.

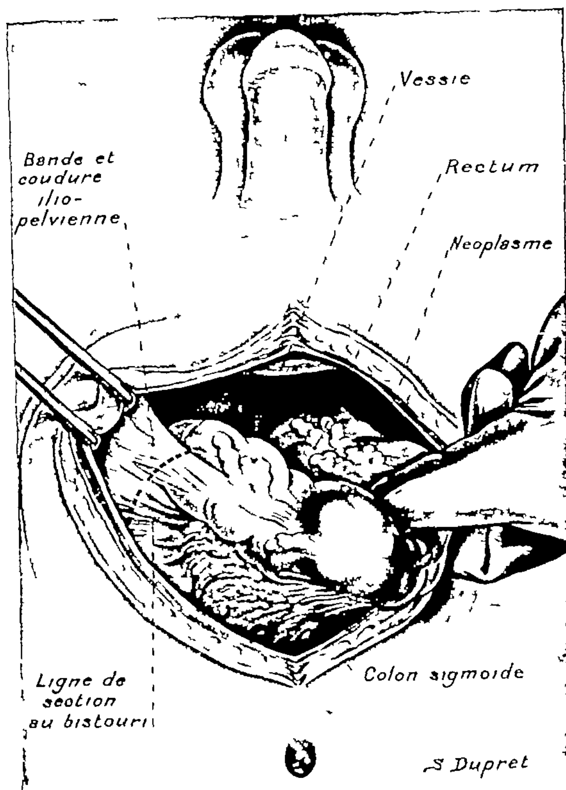


FIG 245.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Patient under spinal anæsthesia Inclined plane The retractor placed at the left revealed a Lane's band which will be divided along the dotted line

Bande et coudure ilio-pelvienne=Ileo-pelvic band and kink. *Vessie*=Bladder *Rectum*=Rectum. *Néoplasme*=Growth. *Ligne de section au bistouri*=Line of incision by the knife *Colon sigmoïde*=Sigmoid colon.

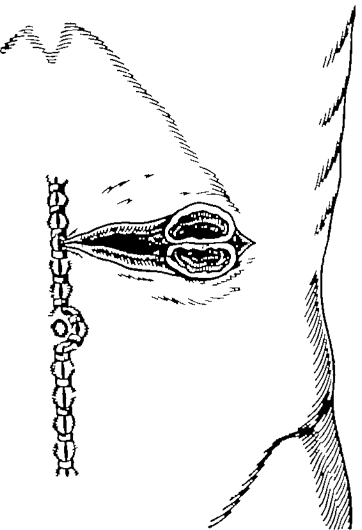


Fig 243 —Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus. First Stage.

The median wound is closed The two ends of the colon are brought into the left angle of the transverse wound of the abdomen, where they will be fixed by some stitches.

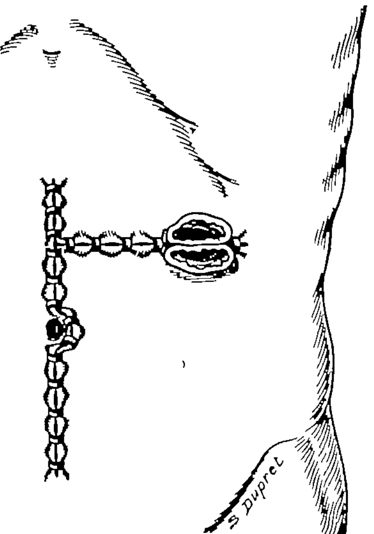


Fig. 244 —Cancer of the Splenic Flexure. Intestinal Obstruction Segmentary Resection followed by a Temporary Anus. First Stage.

View of the abdominal wall. Clips on the skin. It is a good thing to introduce a Paul s tube into the proximal end of the colon. In

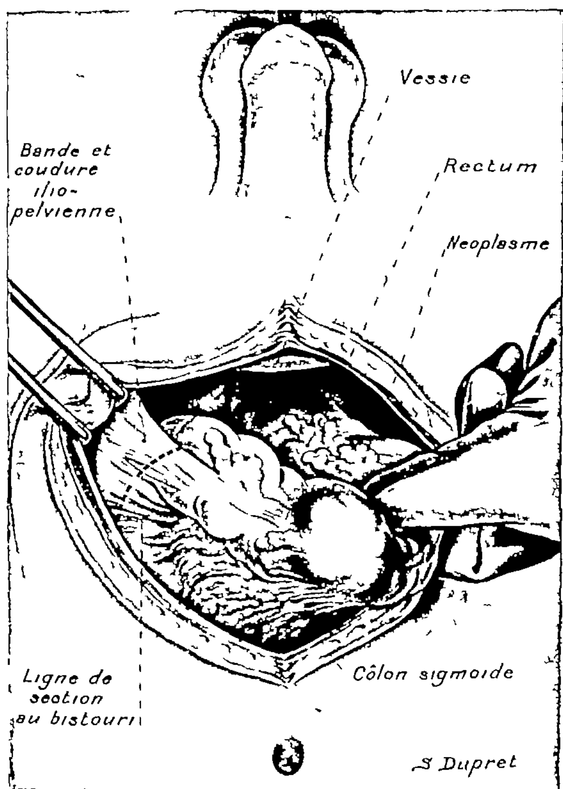


FIG 245.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Patient under spinal anæsthesia Inclined plane The retractor placed at the left revealed a Lane's band, which will be divided along the dotted line

Bande et coudure ilio-pelvienne=Ileo-pelvic band and kink. *Vessie*=Bladder *Rectum*=Rectum. *Néoplasme*=Growth. *Ligne de section au bistouri*=Line of incision by the knife. *Côlon sigmoïde*=Sigmoid colon.

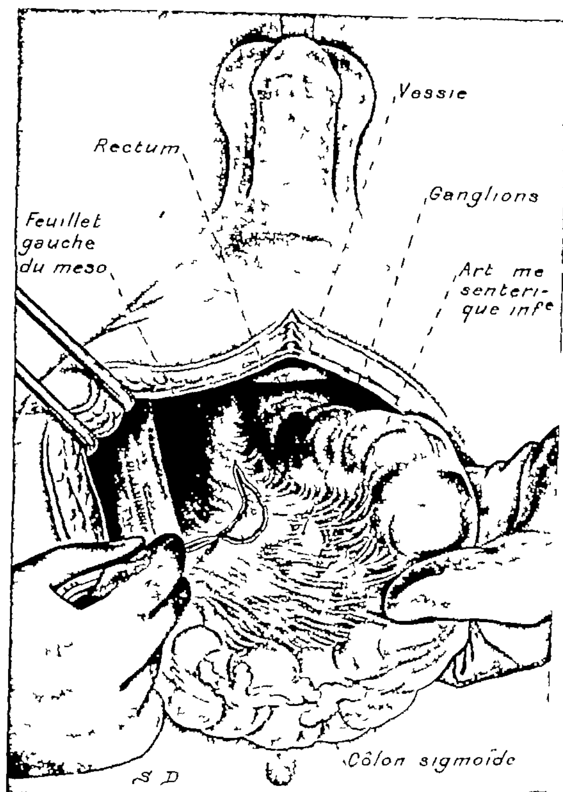


FIG 246 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

The band of Lane has been divided The operator holds the tumour in the left hand *Some glands visible in the meso-colon Division of the external layer of* the meso-sigmoid This section is made a far as possible to the left

Rectum = Rectum. *Vessie* = Bladder *Ganglions* = Glands. *Feuillet gauche du méso* = Left layer of the meso-colon. *Art mésentérique infe.* = Inferior mesenteric artery *Côlon sigmoïde* = Sigmoid colon.

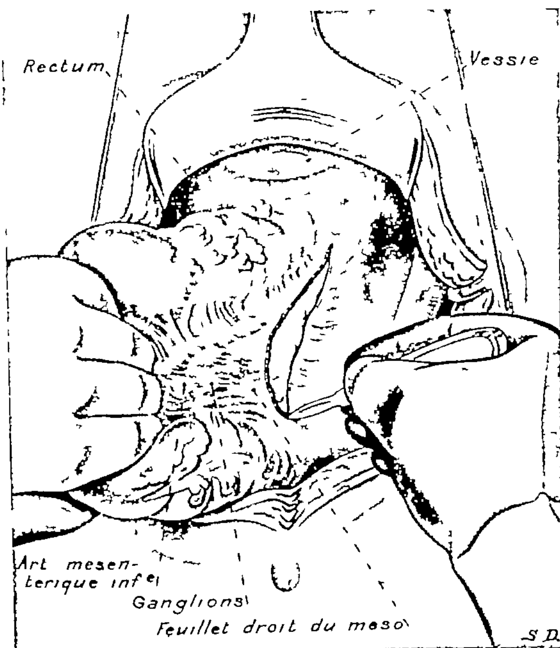


FIG 247 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Division of the right meso colon It is carried out just outside the glands along the whole length of the sigmoid.

Rectum = Rectum. *Vessie* = Bladder *Art mésentérique infe.* = Inferior mesenteric artery *Ganglions* = Glands. *Feuillet droit du méso* = Right layer of the meso-colon.

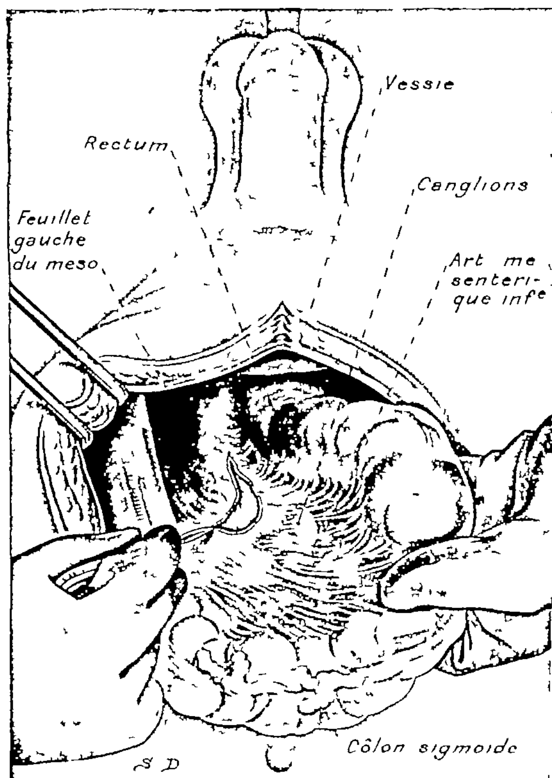


FIG 240.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

The band of Lane has been divided The operator holds the tumour in the left hand Some glands visible in the meso-colon Division of the external layer of the meso-sigmoid This section is made as far as possible to the left

Rect m = Rectum. *Ve sie* = Bladder *Ganglions* = Glands. *Feuillet gauche du méso* = Left layer of the meso-colon. *Art mésentérique infe* = Inferior mesenteric artery *Côlon sigmoide* = Sigmoid colon.

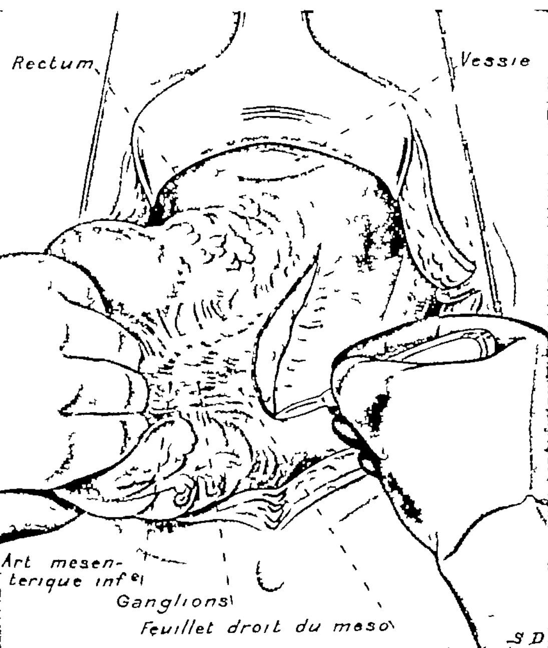


FIG 247 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Division of the right meso-colon It is carried out just outside the glands along the whole length of the sigmoid.

Rectum = Rectum. *Vessie* = Bladder *Art mésentérique infe.* = Inferior mesenteric artery *Ganglions* = Glands. *Feuillet droit du méso* = Right layer of the meso-colon.

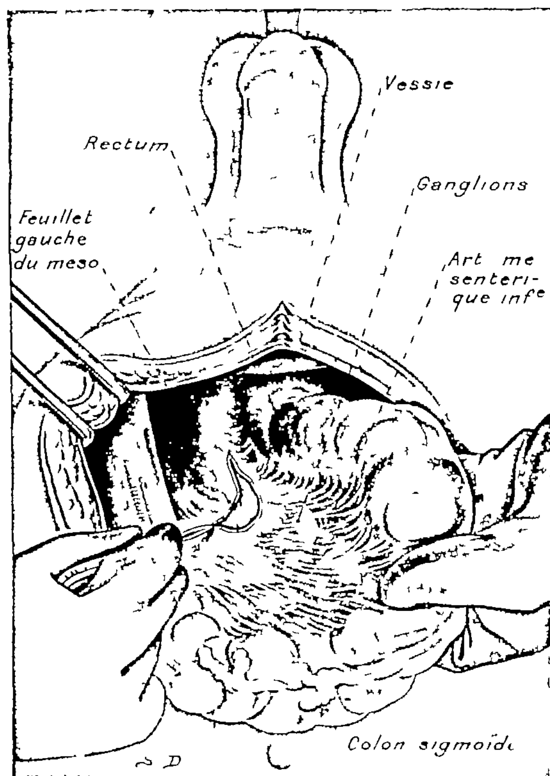


FIG 246.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

The band of Lane has been divided The operator holds the tumour in the left hand. Some glands visible in the meso-colon Division of the external layer of the meso-sigmoid This section is made as far as possible to the left

Rectum = Rectum. *Vessie* = Bladder *Ganglions* = Gland *Feuillet gauche du méso* = Left layer of the meso-colon. *Art mésentérique inf* = Inferior mesenteric artery *Colon sigmoïde* = Sigmoid colon.

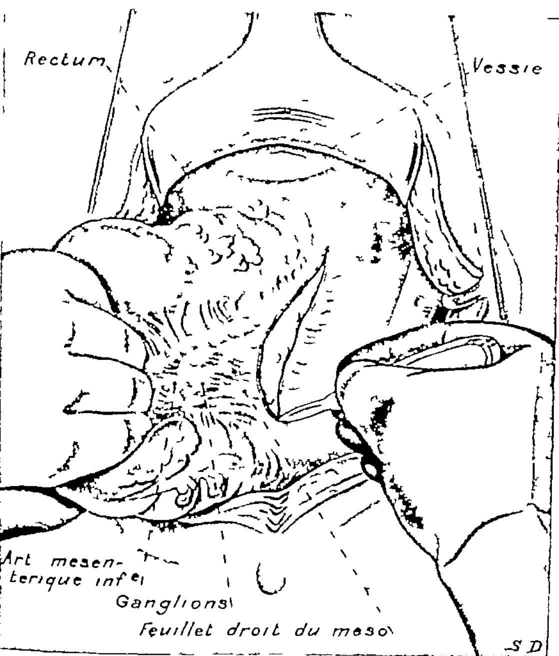


FIG 247—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Division of the right meso-colon. It is carried out just outside the glands along the whole length of the sigmoid.

Rectum=Rectum. *Vessie*=Bladder *Art mésentérique infe.*=Inferior mesenteric artery *Ganglions*=Glands. *Feuillet droit du méso*=Right layer of the meso-colon.

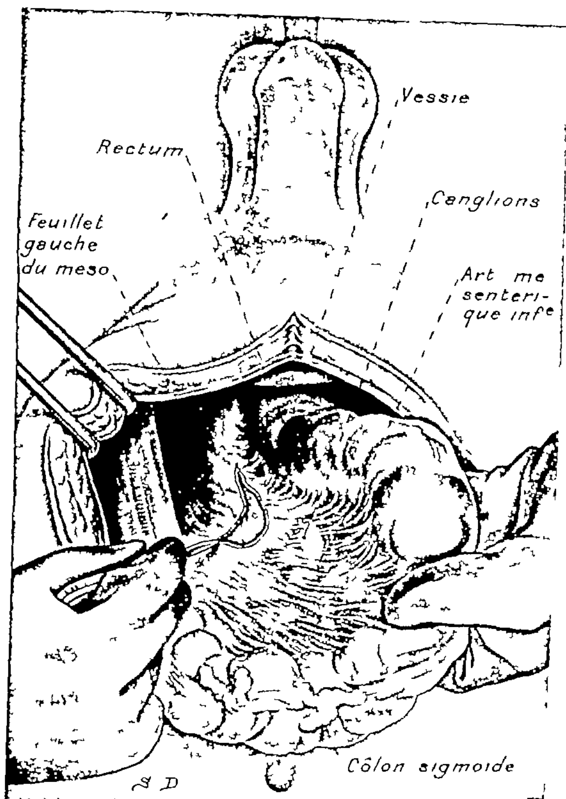


Fig 240.—Cancer of the Sigmoid Removal of the Sigmoid and of the Rectum

The band of Lane has been divided The operator holds the tumour in the left hand. Some glands visible in the meso-colon Division of the external layer of the meso-sigmoid This section is made as far as possible to the left

Rectum = Rectum. *Vessie* = Bladder *Ganglions* = Glands *Feuillet gauche du méso* = Left layer of the meso-colon. *Art mésentérique infe.* = Inferior mesenteric artery *Côlon sigmoïde* = Sigmoid colon.

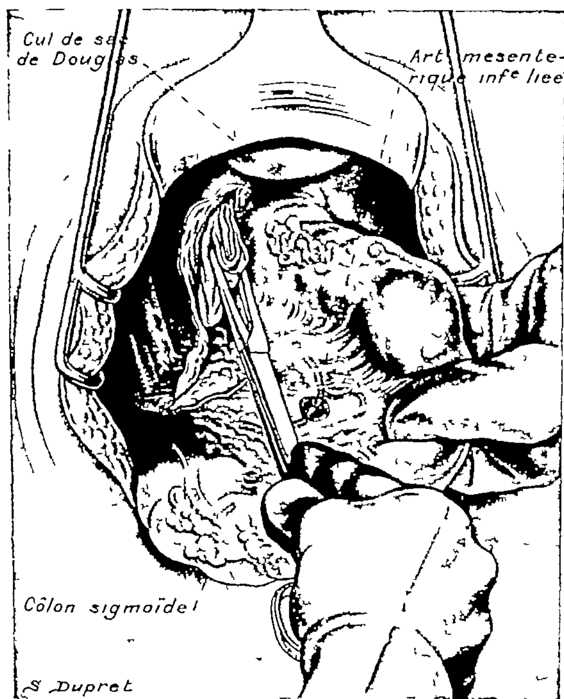


FIG 249.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM.

Freeing the pelvic colon close to the pelvic walls. The fold of the peritoneum is pulled back to the left all the contents of the pelvis are pushed towards the intestine with a compress mounted on forceps.

Cul-de-sac de Douglas=Douglas pouch. *Art mésentérique infe. liée*=Inferior mesenteric artery tied. *Côlon sigmoïde*=Sigmoid colon.

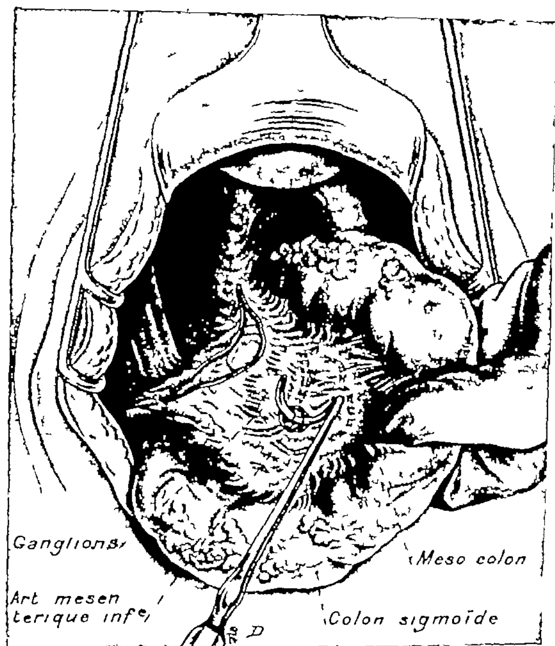


FIG 248.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Ligature of the inferior mesenteric Here the ligature is applied close to the glands In reality it is a little higher so as to remove the suspected glands.

Ganglions = Glands. *Méso-côlon* = Meso-colon. *Art mésentérique infe.* = Inferior mesenteric artery *Côlon sigmoïde* = Sigmoid colon.

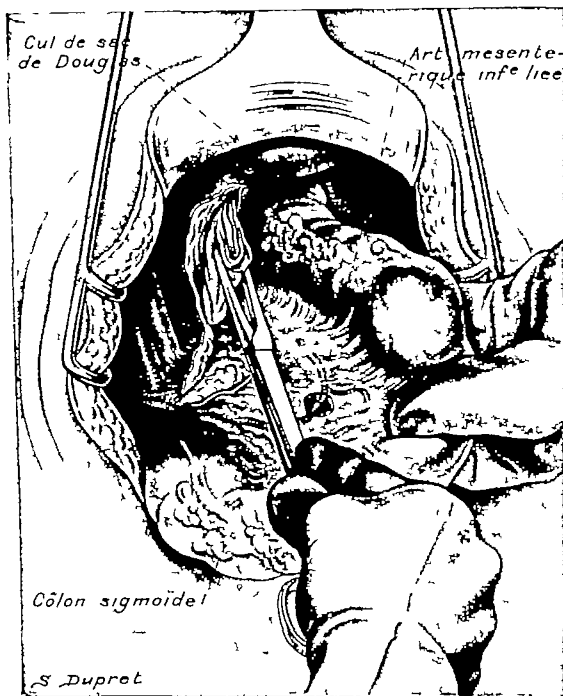


FIG 249 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Freeing the pelvic colon close to the pelvic walls The fold of the peritoneum is pulled back to the left all the contents of the pelvis are pushed towards the intestine with a compress mounted on forceps.

Cul-de-sac de Douglas—Douglas pouch. *Art mésentérique infe liée*—Inferior mesenteric artery tied. *Côlon sigmoïde*—Sigmoid colon.

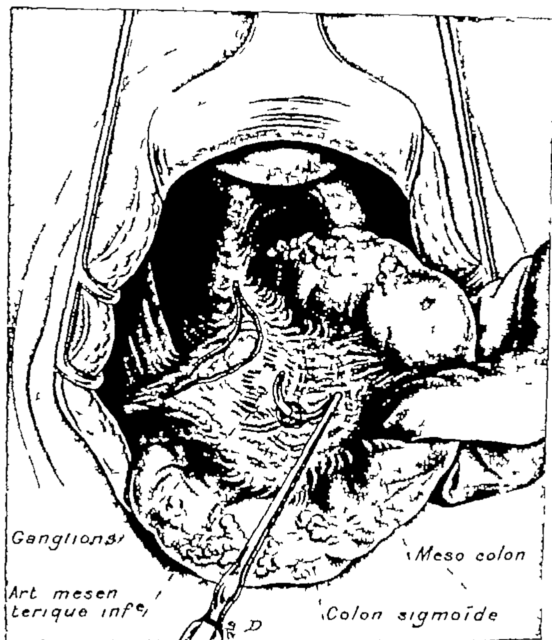


FIG 248.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Ligature of the inferior mesenteric Here the ligature is applied close to the glands. In reality it is a little higher so as to remove the suspected glands.

Ganglions=Glands. *Méso-côlon*=Meso-colon. *Art mésentérique infe.*=Inferior mesenteric artery *Côlon sigmoïde*=Sigmoid colon.

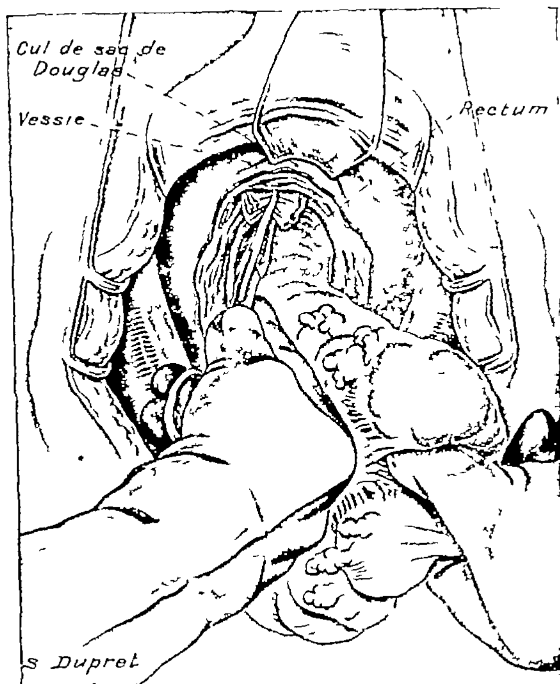


FIG 251 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM Separation of the rectum from the bladder by a compress mounted on forceps

Cul-de-sac de Douglas = Douglas pouch. *Vessie* = Bladder *Rectum* = Rectum.

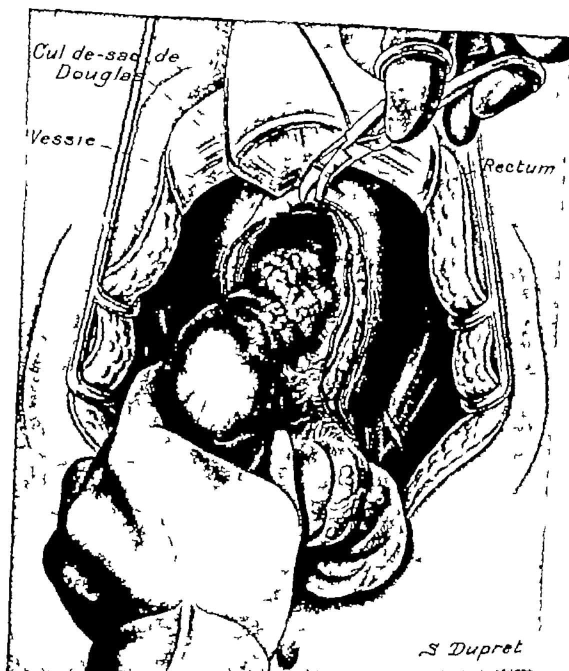


FIG. 260 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

The peritoneum is incised at Douglas pouch. This section prolongs right and left that of the layers of the meso-colon.

Cul-de-sac de Douglas=Douglas pouch. *Vessie*=Bladder *Rectum*=Rectum.

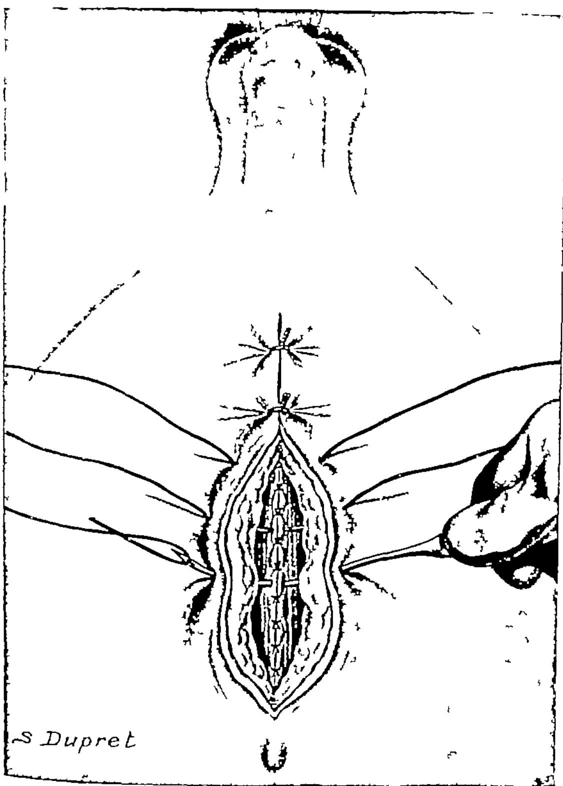


FIG 253.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Closure of the abdomen at two levels. The first with catgut includes the peritoneum; the second with bronze wire, includes the aponeurosis and the skin. Each stitch passes between two peritoneal stitches to make the three levels firm.

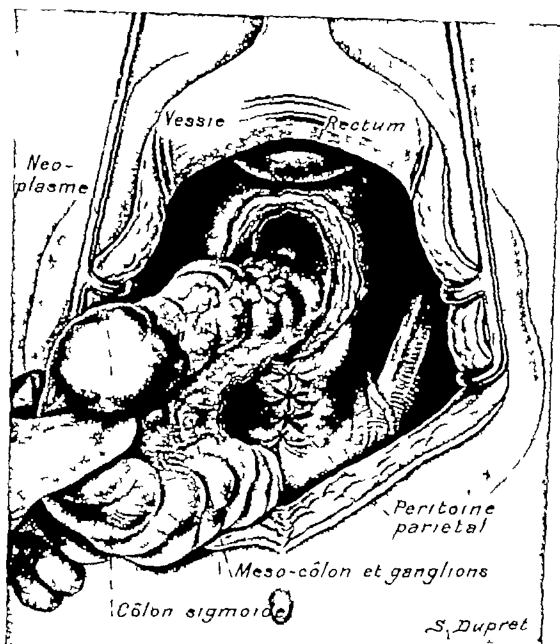


FIG 252 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM.

The inferior mesenteric has been tied and divided so as to mobilise the colon the intestine is held only by its upper and by its perineal part. All the cellulo-glandular tissues remain adherent to the intestine which it is intended to excise The peritoneum has been repaired by four interrupted stitches at the promontory of the sacrum.

Néoplasme = Growth. *Vessie* = Bladder. *Rectum* = Rectum. *Péritoine pariétal* = Parietal peritoneum. *Méso côlon et ganglions* = Meso-colon and glands. *Côlon sigmoïde* = Sigmoid colon.

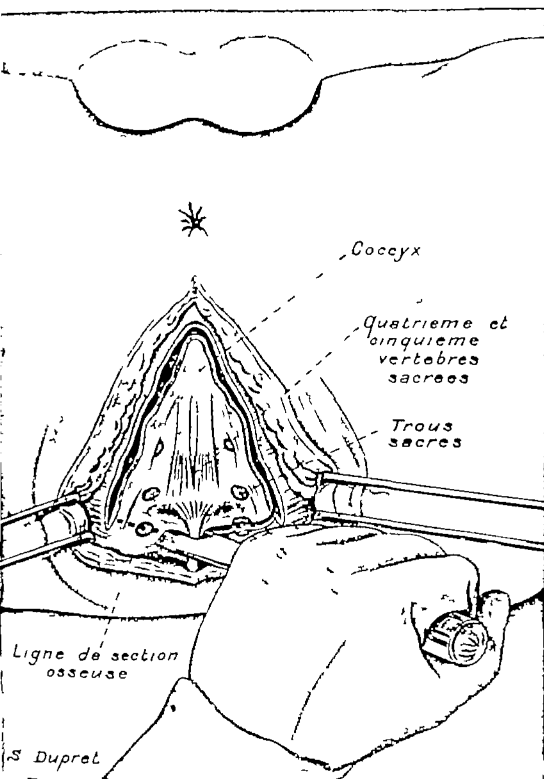


FIG 2.5.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM. PERINEAL STAGE.

The incision has exposed the sacrum and the coccyx.

Coccyx=Coccyx. *Quatrième et cinquième vertèbres sacrées*=Fourth and fifth sacral vertebræ *Trous sacrés*=Sacral foramina. *Ligne de section osseuse*=Line of osseous incision.

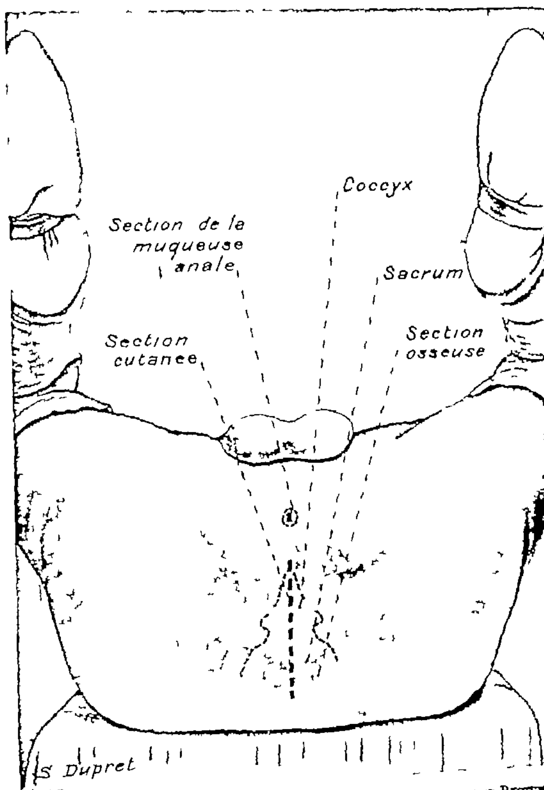


FIG 254 — CANCER OF THE SIGMOID. REMOVAL OF THE SIGMOID AND OF THE RECTUM PERINEAL STAGE

The dotted line round the anus indicates the muco-cutaneous incision, which will permit of liberation of the anal segment without excision of the sphincter The middle dotted line indicates the incision which will give access to the rectum after resection of the coccyx and of a part of the sacrum

Section de la muqueuse anale = Incision of the anal mucosa. *Coccyx* = Coccyx. *Sacrum* = Sacrum. *Section cutanée* = Cutaneous incision. *Section osseuse* = Osseous incision.

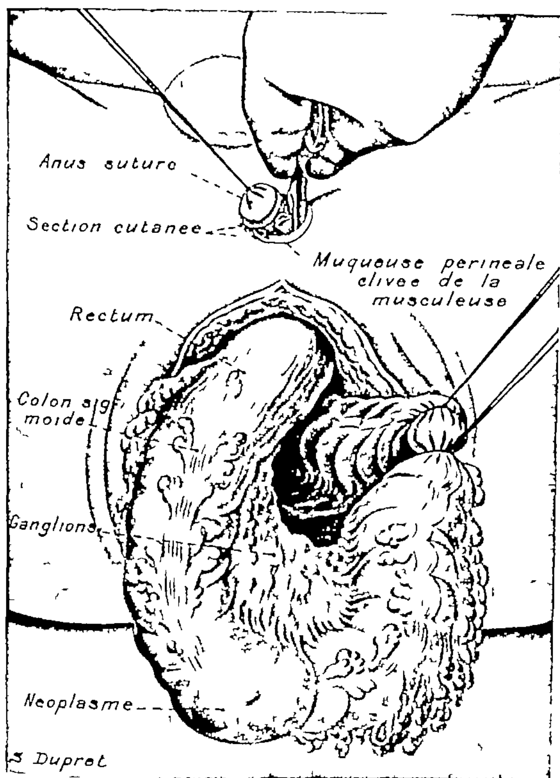


FIG 257.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM. PERINEAL STAGE

The skin of the anus has been divided close to the mucosa, circularly as in the operation for hæmorrhoids, the anus having been closed by a purse-string suture; a swab mounted on forceps separates the mucosa of the anal canal from the sphincter The sigmoid has been brought outside the wound and then tied very high up at a point which will permit of its being lowered easily and without traction through the anal canal.

Anus suturé=Anus sutured. *Section cutanée*=Cutaneous incision. *Muqueuse périnéale clivée de la musculeuse*=Perineal mucosa separated from the muscular tissue. *Rectum*=Rectum. *Côlon sigmoïde*=Sigmoid colon. *Ganglions*=Glands. *Néoplasme*=Growth.

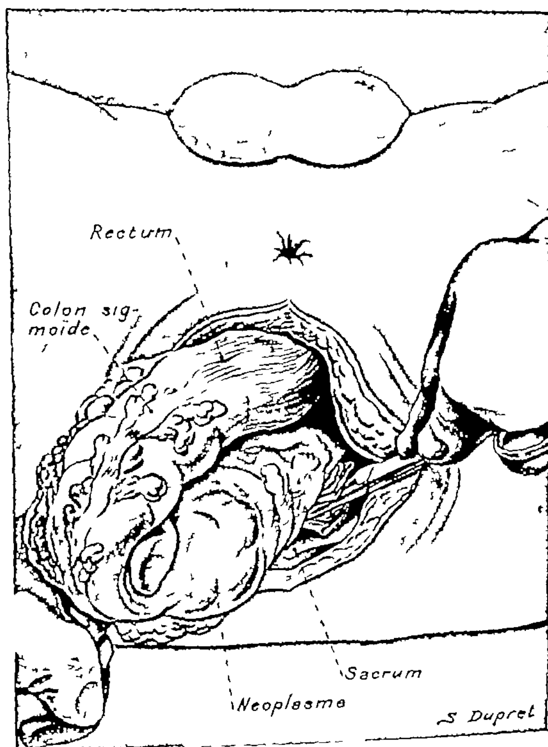


Fig 256.—Cancer of the Sigmoid Removal of the Sigmoid and of the Rectum Perineal Stage.

The coccyx and the sacrum have been divided. The whole cellulo-glandular mass of the pelvis has been retracted to the rectum The levatores ani have been divided close to the rectum The whole of the sigmoid and of the rectum has been drawn into the wound.

Rectum = Rectum. *Colon sigmoide* = Sigmoid Colon. *Neoplasme* = Growth. *Sacrum* = Sacrum.

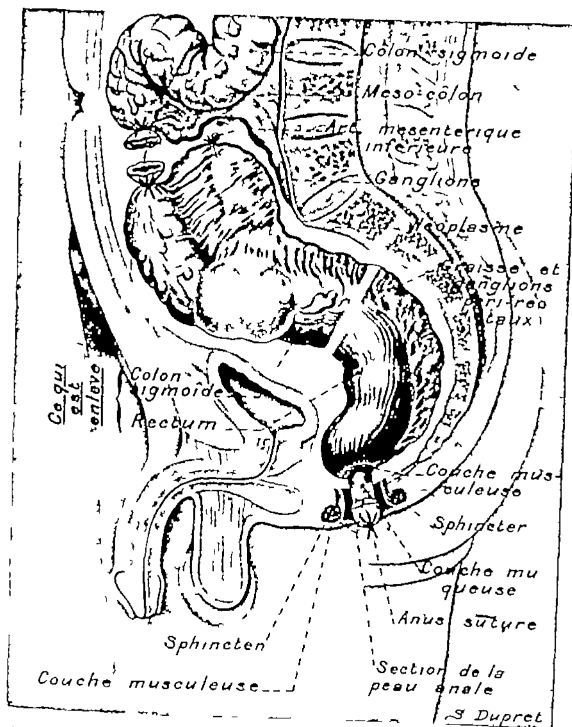


FIG. 261 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM PERINEAL STAGE.

Semi-diagrammatic drawing showing the parts of the large intestine removed during the previous operation. The rectum, anal canal (minus the sphincter) and the greater part of the sigmoid are removed. Note above the ligature and division of the inferior mesenteric The upper end of the sigmoid can be mobilised by stripping the colon from the parietal peritoneum on the left side, and is easily brought to the anus. The white line between the rectum and the sigmoid represents 5 or 6 centimetres of the sigmoid excised, to make the drawing more easily understood.

Ce qui est enlevé—The part removed. *Colon sigmoide*—Sigmoid colon. *Rectum*—Rectum *Méso-colon*—Meso-colon. *Art mésentérique inférieure*—Inferior mesenteric artery *Ganglions*—Glands. *Néoplasme*—Growth. *Graisse et ganglions péri rectaux*—Fat and peri-rectal glands. *Couche musculeuse*—Muscular layer. *Couche muqueuse*—Mucous layer *Sphincter*—Sphincter *Anus suturé*—Anus sutured. *Section de la peau anale*—Section of the skin of the anus



FIG 200.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM PERINEAL STAGE.

The intestinal cul-de-sac is fixed to the skin of the anus by four stitches. The ligature of the intestine will come off by itself in a few days; if the patient be troubled by flatus, it is easy to cut it. Two drains soaked in collargol ointment are placed between the intestine and the skin

Côlon sigmoïde suturé—Sigmoid colon sutured.

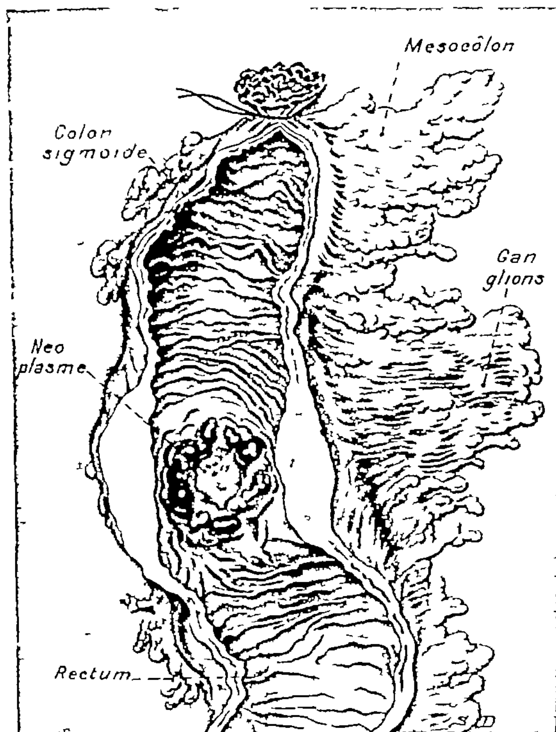


FIG 203 —CANCER OF THE SIGMOID. REMOVAL OF THE SIGMOID AND OF THE RECTUM

Anatomical piece corresponding to the operation just described. The cancer is situated fairly near the middle of the sigmoid (short loop) The lower part of the drawing representing the rectum, does not appear in this figure

Côlon sigmoïde = Sigmoid colon. *Méso-côlon* = Meso-colon. *Néoplasme* = Growth. *Ganglions* = Glands. *Rectum* = Rectum.

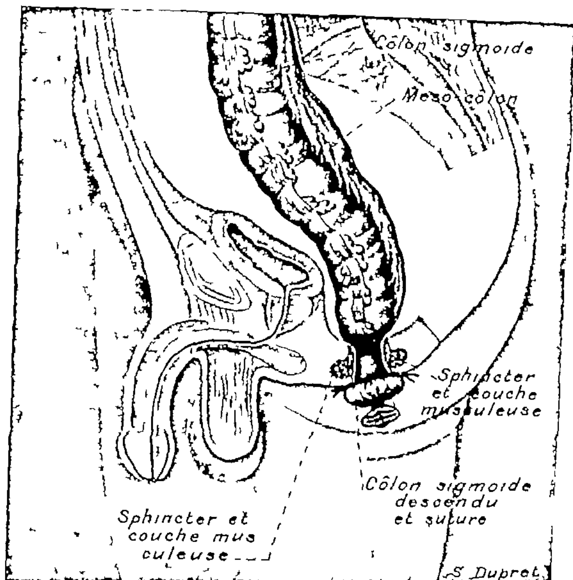


FIG 262 —CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM. PERINEAL STAGE.

Semi-diagrammatic drawing showing the end of the operation. Note the removal of the coccyx and of a part of the sacrum and the complete emptying of the pelvis, which only contains the meso-colon, the intestine and the urinary organs.

Côlon sigmoïde = Sigmoid colon. *Méso-côlon* = Meso-colon. *Sphincter et couche musculeuse* = Sphincter and muscular layer *Côlon sigmoïde descendu et suturé* = Sigmoid colon brought down and sutured.

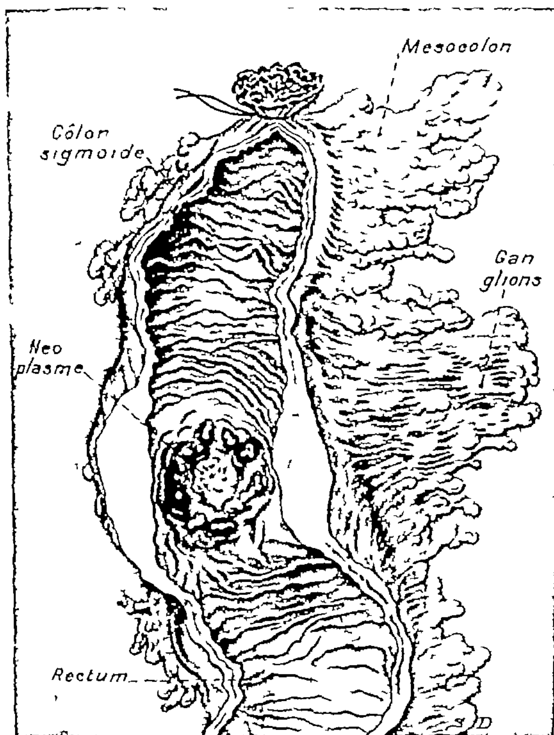


FIG 263.—CANCER OF THE SIGMOID REMOVAL OF THE SIGMOID AND OF THE RECTUM

Anatomical piece corresponding to the operation just described The cancer is situated fairly near the middle of the sigmoid (short loop) The lower part of the drawing representing the rectum does not appear in this figure

Côlon sigmoïde = Sigmoid colon. *Méso-côlon* = Meso-colon. *Néoplasme* = Growth. *Ganglions* = Glands. *Rectum* = Rectum.

IX

ADENOMA OF THE PROSTATE

Freyer's Operation

PROSTATECTOMY can be performed by the suprapubic or by the perineal route. The former can be carried out by Freyer's method, or by the open trans peritoneal route, as in removal of a tumour of the bladder Perineal prostatectomy may be performed by the anterior perineal (transverse pre-anal) or by the lateral ischio-rectal incision (Woelcker)

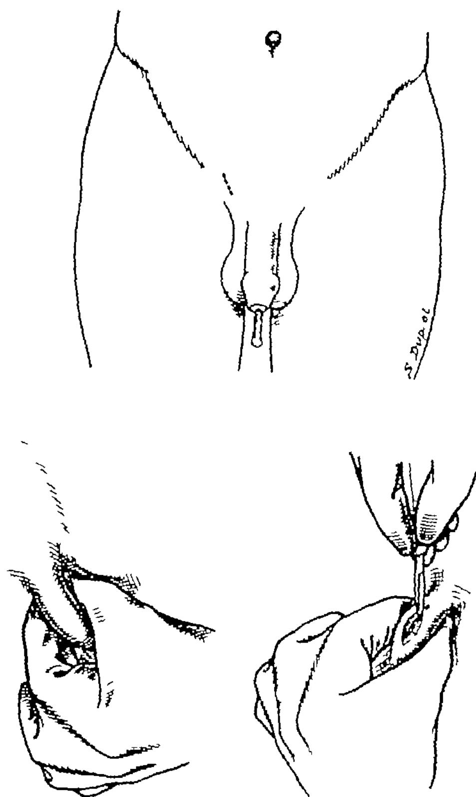
Adenomectomy by enucleation (Freyer's method) has been adopted for fifteen years by nearly all surgeons and urologists It is an ingenious operation, one of the best conquests of modern surgery, but, notwithstanding the great services rendered by Freyer's original operation, ought it to remain, without modification, in the form handed down to us by its originator ? Do its indications extend to all the cases of prostatic hypertrophy? What are its disadvantages and advantages ? Which are the prostates that require operation in two stages ? Has not this last method been abused ? Are there still some indications for perineal prostatectomy ? In this last case, should the anterior perineal (Young, Wildboltz) or the ischio-rectal (Woelcker) method be chosen ? How, lastly, should the small, hard, atrophied prostates and the adenomata with peri prostatitis be treated ?

Such are some of the problems occupying the attention of many surgeons.

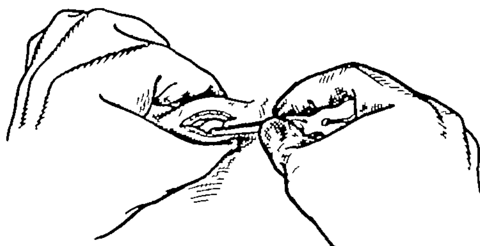
The original operation of Freyer is, *in our experience*, still indicated in three-quarters of the cases of adenoma A large mobile, well circumscribed, easily enucleable, adenoma can be removed by the finger, with the eyes shut, without risk of recurrence, and generally without subsequent complications

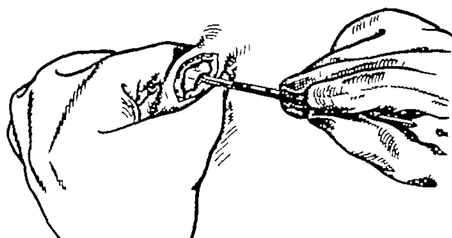
We have performed this operation more than 500 times The mortality has always been less and less

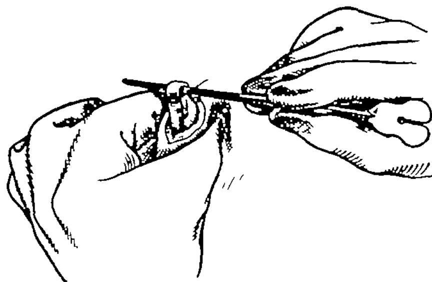
In 1920 we had a series of fifty prostatectomies without a death. The incidents we have noticed after Freyer's operation have been the following



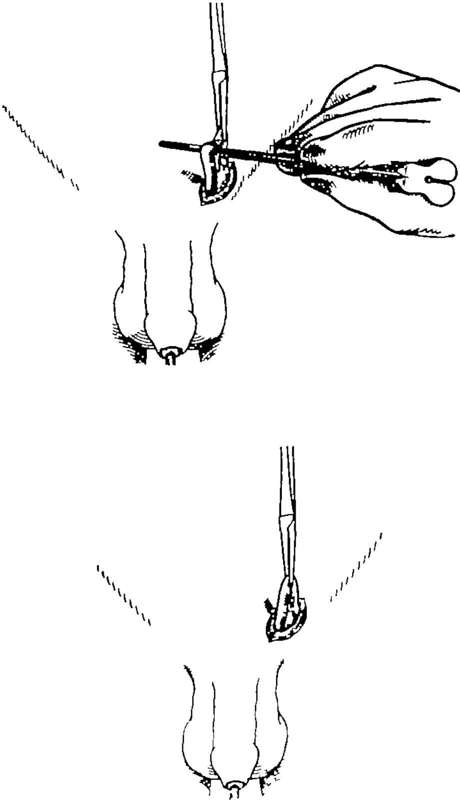
FIGS. 264, 265, 266.—SUPRAPUBIC PROSTATECTOMY. DIVISION OF THE VASA DEFERENTIA.



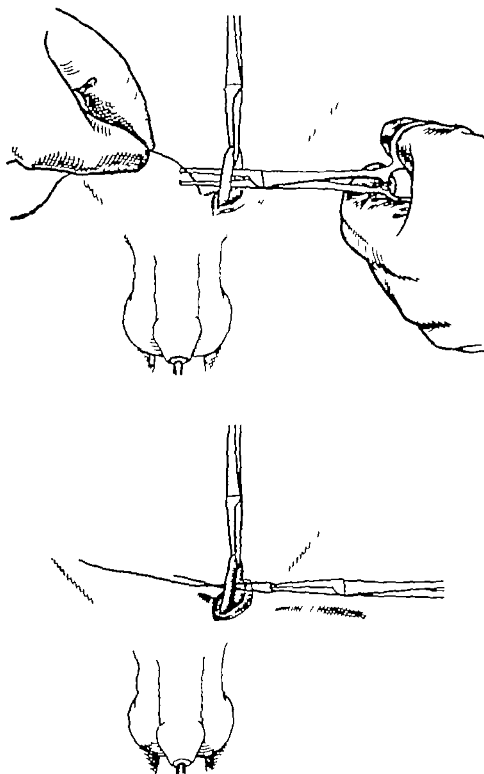




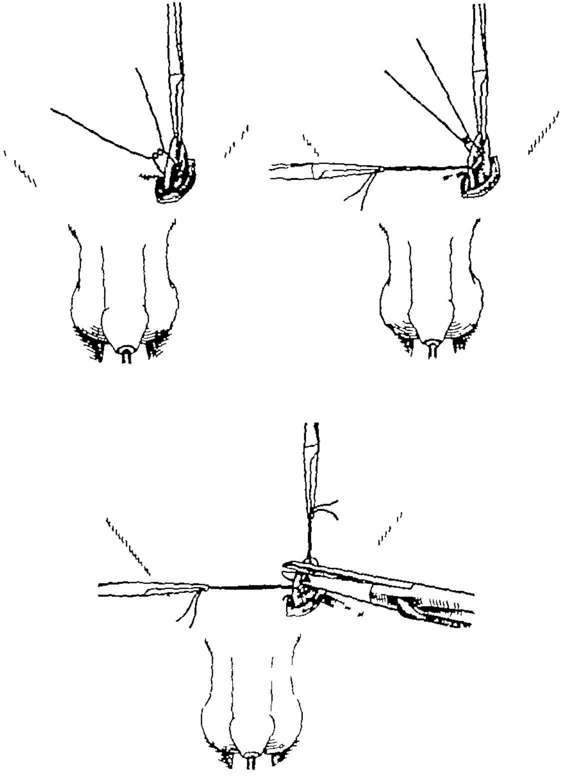
FIGS. 267 268, 269 —SUPRAPUBIC PROSTATECTOMY



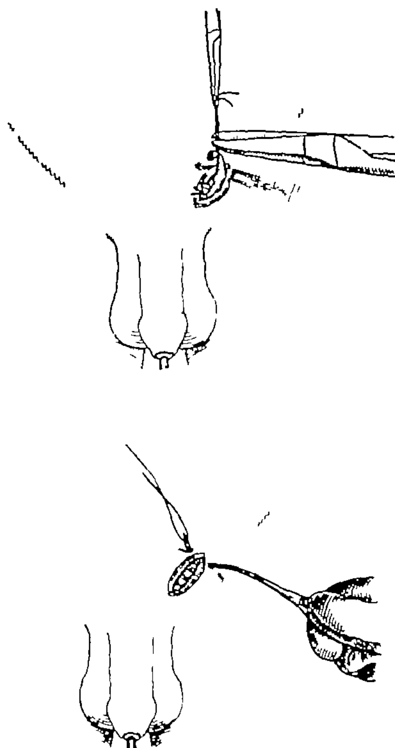
FIGS. 270 271.—SUPRAPUBIC PROSTATECTOMY



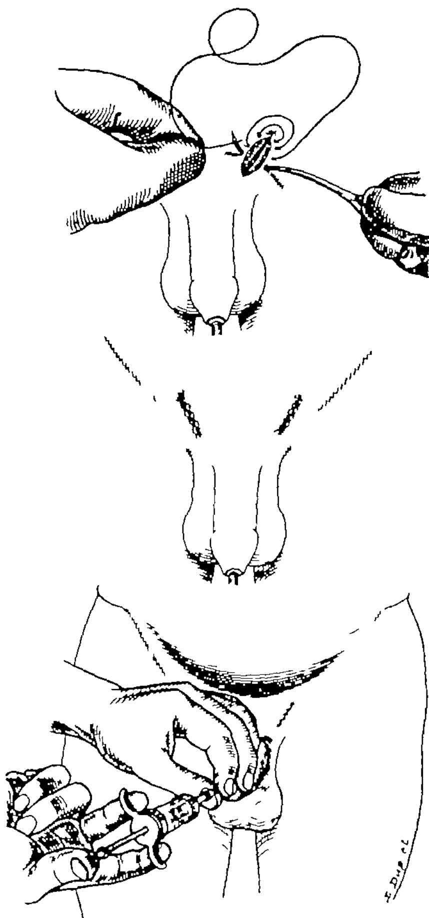
FIGS 272 273 —SUPRAPUBIC PROSTATECTOMY



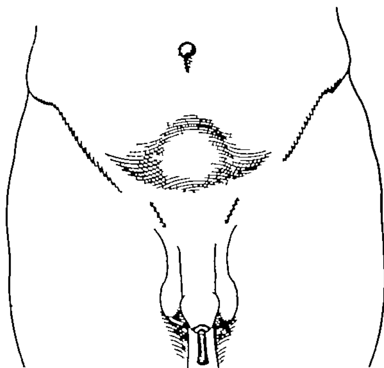
FIGS. 274 275 276.—SUPRAPUBIC PROSTATECTOMY



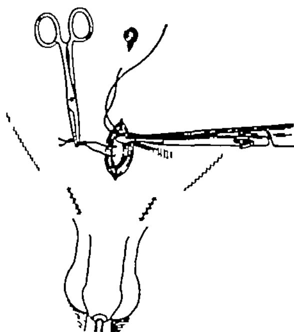
FIGS. 277 278 —SUPRAPUBIC PROSTATECTOMY



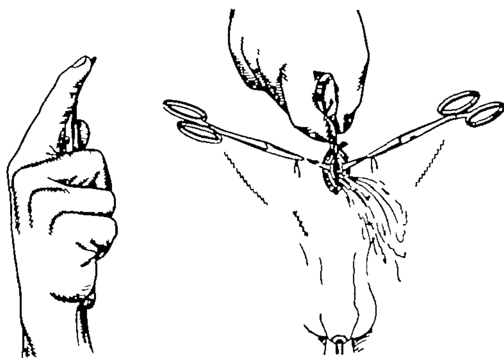
FIGS. 279 280 281 —SUPRAPUBIC PROSTATECTOMY

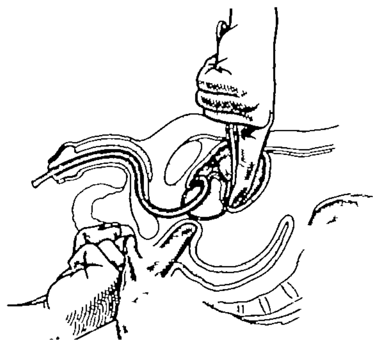


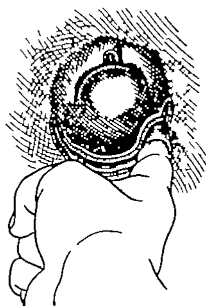


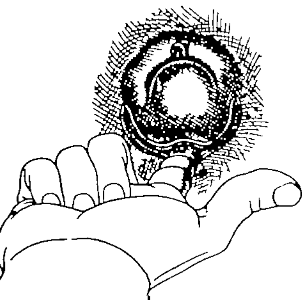
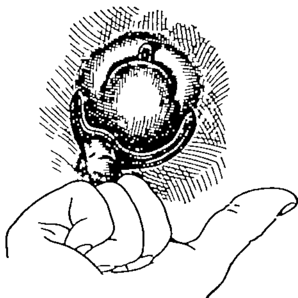
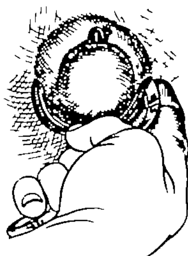
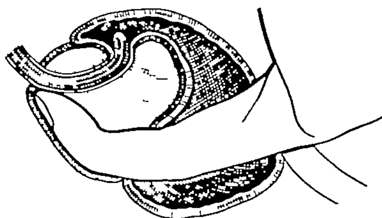


FIGS. 282, 283, 284.—SUPRAPUBIC PROSTATECTOMY

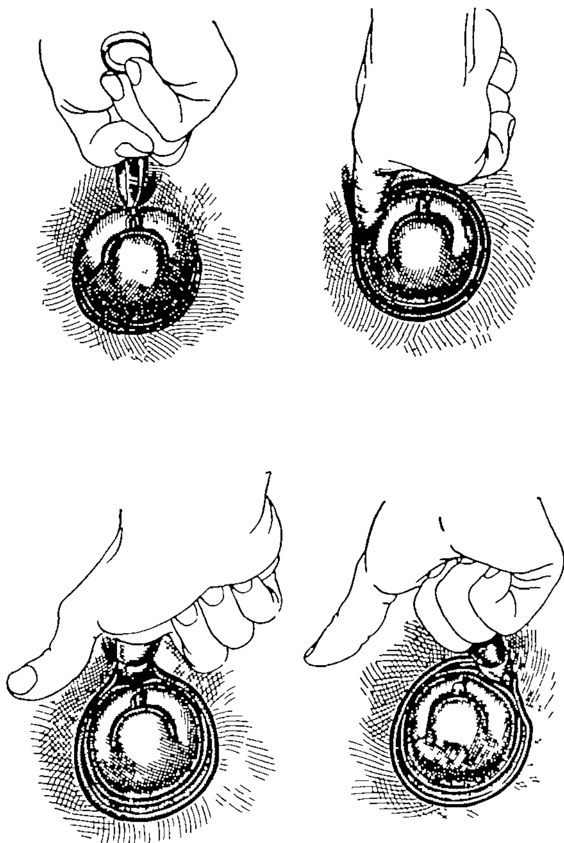




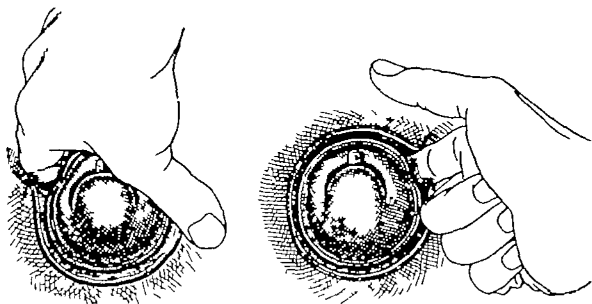


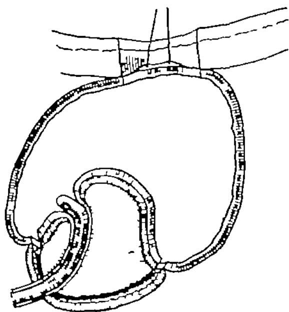





FIGS. 288, 289 290 291 292 293.—SUPRAPUBIC PROSTATECTOMY

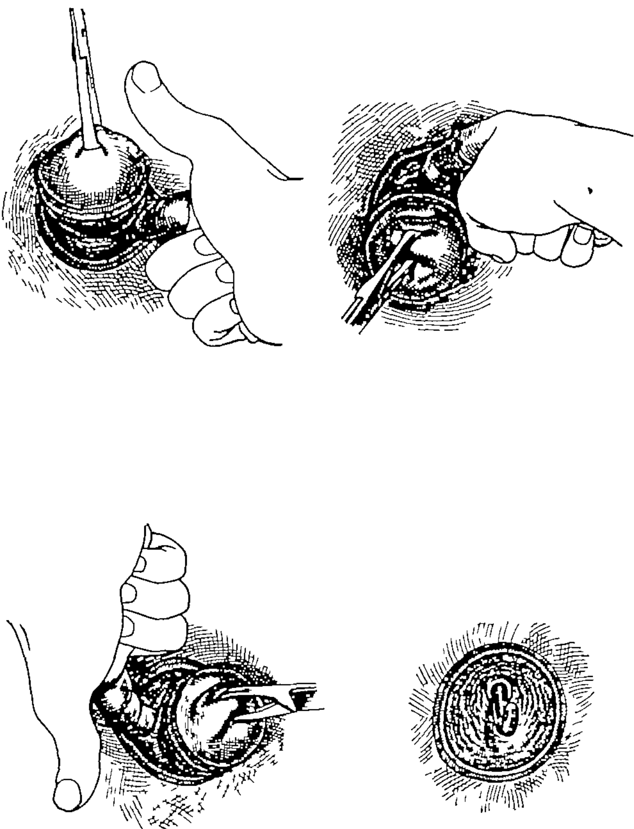


FIGS. 294, 295, 296, 297.—SUPRAPUBIC PROSTATECTOMY

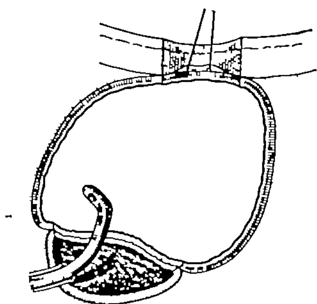


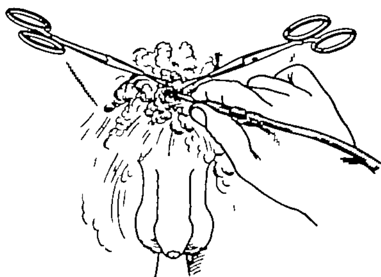


Figs. 298, 299 300.—Suprapubic Prostatectomy

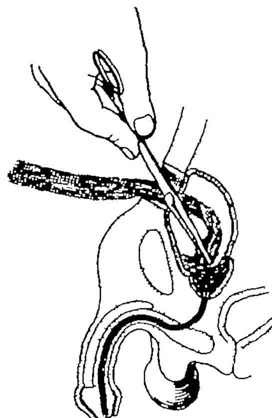


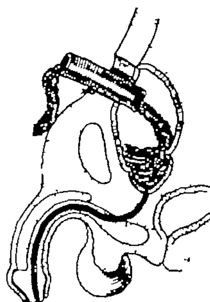
FIGS. 301 302 303, 304 —SUPRAPUBIC PROSTATECTOMY





FIGS. 305 309.—SUPRAPUBIC PROSTATECTOMY





FIGS. 307 308.—SUPRAPUBIC PROSTATECTOMY